Research on the Teaching Mode of Computer-Assisted Technology in English Classrooms of Application-Oriented Universities

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Abstract. Information technology plays an irreplaceable role in the development of education. To a great extent, the advent of the computer-assisted language learning model subverts the traditional classroom mode characterized by "teaching by teachers while listening by students", thereby effectively improving the disadvantages exposed by the traditional teaching mode. On the same note, English teaching in application-oriented universities in China has consistently followed the trend of the times, taking English as a basic subject to cultivate compound, innovative, and practical talents. Additionally, during the actual teaching process, with the basic goal of improving students' practical application ability, English teaching in application-oriented universities in China tends to fully arouse students' learning interest and effectively improve teaching quality and efficiency. Within this context, to improve the talent training quality of application-oriented universities, this paper first focuses on the English classroom teaching mode under the background of computer-assisted technology and then presents different English classroom modes by setting up an experimental group and a control group, tracking the English learning situation of students from non-English majors. Secondly, based on applying SPSS software to analyze the corresponding experimental results, this paper further explains the advantages of using computer-assisted software to conduct interactive teaching mode compared with traditional teaching mode. Regarding the research significance, this research intends to improve the integration of computer-assisted technology in English classrooms and explore an interactive teaching mode that can combine technology with classrooms, thus providing internal impetus for the sustainable development of application-oriented universities.

Keywords: Application-oriented Universities · Computer-assisted Technology · Traditional Teaching Mode · Interactive Teaching

1 Introduction

Under the background of increasingly intense international competition, countries all over the world are paying extensive attention to the integration between higher education and intelligent computer technology. In 2004, for instance, the Higher Education Department of the Ministry of Education of China officially issued the *Requirements on College*

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English Course, which expressly stated in terms of the teaching model that "a large number of advanced information technologies should be used to promote computer-based and network-based English teaching" [1]. According to this requirement, colleges and universities have been successively exploring the informationization of English classes. In particular, application-oriented universities have also launched proactive exploration in this field, although the results do not meet expectations. The main reasons can be attributed to a host of factors, encompassing the long-term lack of good language environment and habits of students enrolled in application-oriented universities, the uneven English basis leading to their poor average English proficiency, the lack of basic teaching equipment for college teachers, and the lack of resources to match the cutting-edge language teaching, etc. With the increasingly significant information trend of the current social development, the combination of multimedia-assisted teaching and English teaching has attracted increasing public attention. In line with this development trend, application-oriented universities not only establish digital and intelligent teaching conditions with the aid of computer-assisted teaching software (Yin Xin, 2018) [2] but also effectively carry out interactive English classroom teaching and create corresponding learning situations to fully mobilize students' learning initiative, thus providing great information resources for teaching, as well as improving students' comprehensive quality and teaching quality.

Undoubtedly, the implementation of interactive teaching with the help of computer-assisted technology (hereinafter referred to as the "CAT") is beneficial to solving various drawbacks exposed by traditional teaching, including low students participation in class, dull classroom atmosphere, fewer opportunities for communication and practice, poor language practice ability, etc. [3]. To cultivate international high-quality applied talents, English teachers of application-oriented universities should integrate computer-assisted software into their daily language teaching activities, creating a ubiquitous English learning environment through the interactive teaching mode featuring "task preparation before class, situational interaction in class, and efficient after-class evaluation".

2 Analysis of the Application of CAT in English Teaching

2.1 Theoretical Knowledge of Constructivism

Constructivism, as an important component of cognitivism learning theory, advocates that learning is conceptually defined as a process in which learners acquire knowledge through meaning construction with the help of the teaching scaffolding set up by teachers and relevant learning materials in a certain social and cultural environment, rather than a process in which knowledge is acquired through teaching by teachers. Regarding English learning, constructivism holds that it is "a process in which learners construct their understanding of English; students are not only the subjects of teaching practice but also the active constructors of understanding new knowledge, instead of the passive and indoctrinated receivers of external stimuli, and; teachers are the organizer of teaching practice and the external helper of semantic construction, rather than semantic indoctrinators"[4]. Therefore, the essence of constructivism theory can be described that students are the theme and center of teaching that needs to actively construct knowledge, whereas teachers need to leverage diversified resources represented by computer

technology to stimulate students' initiative and consciousness, thus promoting students' knowledge construction.

On the other hand, constructivism highly emphasizes the importance of interaction, contending that interactive learning is one of the important means of knowledge construction. To put it concretely, interaction can be utilized by students to test or change the constructed "understanding" to make it more in line with objective requirements. Meanwhile, the interaction in the learning process is also conducive to promoting the learning and understanding process. Consequently, in English teaching, it is imperative to attach great importance to the communication and cooperation between teachers and students as well as between students.

2.2 A Breif Introductoin of CAT

Computer Aided Technologies (CAT) refers to technologies and theroies applied in the process of product design, manufacture and test aiming to help with the completion of tasks in certain areas including Computer Aided Design (CAD), Computer Aided Manufacture and Computer Aided Instruction (CAI). The term "Aided" emphasize human orientation constructing a human-computer system with a close interaction between the user and computer.

Based on the educational theory-Constructivism and the developement of CAT, there has been a dramatic change in teaching. Different from the traditional teaching model which typically focuses on the knowledge delivery through teachers's verbalization neglecting students' subjectivity, as a result, students can merely achieve passive learning. While with the application of CAT in courses, a new teaching mode-Interactive Teaching Mode (ITM) has been introduced to the courses. In the process, teacners can display diverfied sources such as context, image, video, audio, animation and other information sources in front of students through an interactive way thereby promoting the efficiency of receiving knowledge.

2.3 Framework of Interactive Teaching Mode with CAT

By definition, the implementation of interactive English teaching with CAT refers to the creation of a virtual English learning environment with the help of a series of resources including multimedia, network, and mobile devices, in which teachers can not only design specific and feasible tasks before class so that students can look up relevant materials in the library and network in advance, but also complete relevant tasks in class through various forms of language activities such as expression, communication, negotiation, explanation, and inquiry, thereby enabling students to learn, master, and use language (Guo Wanqun & Yang Yonglin, 2002: 67–72)[4] (as seen in Fig. 1).

As can be seen from Fig. 1, it's distinct to see how this model works with an illustration of an Englsih course. First of all, teachers should create a learning environment for students by assigning some content-related tasks online such as cultural exploration, group presentation, etc. At the same time, students can make full use of the sources they collect online to facilitate the completion of the tasks. Afterwards, with the help of CATs, teachers can enrich the contents through a vivid knowledge impart and likewise, students can be given full play in their subjective initiative. In the process of engaging

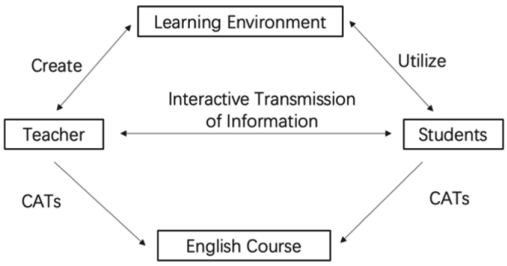

Fig. 1. Interactive Teaching Modal with CAT in English Reading Class

both teachers and students in interactive courses with CATs such as multi-modal media resources and VR, teachers are organizers of teaching practice and external helpers of semantic construction, rather than semantic indoctrinators and students are active constructors of new knowledge, which represents an equal interactive relationship [5]. In a nutshell, this framework helps to achieve the teaching goal of improving students' comprehensive language competence.

3 Current Situation of English Classroom Teaching Model in Application-Oriented Universities in the Context of Computer-Assisted Language Learning

To understand the English basis of university students and the current situation of university English classroom mode in application-oriented universities, the author conducted an interview and investigation with the undergraduates and peer teachers of the application-oriented university in the region where the author is located, with three prominent drawbacks identified. Specifically, the first drawback is the single English classroom teaching mode. Given that classroom teaching is a key link for application-oriented universities to cultivate international talents, firmly grasping classroom teaching essentially means mastering the hinge of cultivating international talents. Although application-oriented universities have carried out English teaching assisted by multimedia technologies represented by computers, most English classes are still dominated by traditional teaching mode and supplemented by interactive language teaching mode [2]. Teachers are more inclined to project the knowledge stored in the computer onto the large screen with rigid text information, which in turn leads to the lack of bilateral activities in the classroom. More importantly, in this teaching mode, students are very likely to fall into a state of inattention, which leads to a decline in their learning efficiency. The second drawback is the limited teaching infrastructure and resources. This is mainly manifested in the lack of electronic textbooks, the shortage of digital library resources, and the insufficiency of online courses. It is worthy of recognition that the foundation of creating an interactive language classroom must be combined with modern information equipment and resources. Nevertheless, at present, the importance of electronic teaching materials has been neglected in English teaching in most application-oriented universities, and the development of electronic teaching materials has not been strengthened. To make

matters worse, traditional printed textbooks can neither meet the actual demands of students nor are they conducive to efficient paperless learning. The last defect is the lack of students' interactive cognition. Under the influence of the long-term exam-oriented education environment, university students at the present stage have formed a mindset, that is, relying on textbooks to carry out English learning instead of actively carrying out interactive English learning. Moreover, the single CAT used by teachers in the classroom is difficult to stimulate the interest of most students, which in turn makes the learning effect counterproductive(MA Yuchong & Chen JianLin, 2012: 28–33) [6]. This mindset further limits students' ability to interactive learning, as well as the construction of students' English thinking logic and knowledge system.

4 Advantages of Interactive Classroom with CAT

The teaching models with CAT are roughly divided into four categories, including the classroom instructional model, individualized learning model, distance instruction model, and experimental instruction model. Because of the limitation of technology and financial problems, the classroom instructional model and the individualized learning model are most prevalent in FLT in China (Kang Deshan & Fan Liping, 1999: 276–278) [7]. However, the aforesaid two models expose a series of obvious drawbacks, such as the inability to get rid of the teacher-centered knowledge teaching model, the inability to obtain timely feedback from teachers, and the lack of classroom interaction. Under the impact of the COVID-19 pandemic, various universities have opened online and offline mixed teaching classes beyond space restrictions and developed rich online teaching resources. In this context, the interactive teaching model reflects significant advantages.

4.1 Achieve Task-Oriented and Collaborative Language Courses

On the one hand, through the design of pre-class, in-class, and after-class teaching activities with rich contents and forms, such as Word Contests, Speech King, English Debate Competitions, Sitcom Performances, Dubbing Contests, and so on (Zhao Shuanko and Yang Hong, 1999) [8], interactive teaching encourages students to participate in the classroom in groups and sets up appropriate reward and punishment mechanism to stimulate students' interest in participating in the classroom activities. On the other hand, it also endows the process of language acquisition with a certain degree of sociality and situationality, thus providing students with the opportunity to show and express themselves.

4.2 Enhance the Appeal of Knowledge to Students and Their Interest in Learning

Different from traditional classroom teaching, interactive classroom uses various ways including different mobile terminal platforms, online learning resources, multimodal resources, etc. to mobilize students' multiple senses and form diversified effects, thus transforming boring textual knowledge into vivid situational knowledge. In essence, it is conducive to creating a sensory, interesting, and open experiential classroom.

4.3 Encouraging Teaching Adapting to Students' Differences

During the process of implementing interactive teaching, while controlling the task difficulty, teachers can construct teaching scaffolding through relevant novel ways such as computer-assisted language software, teacher-student interaction, and questioning. On the one hand, it can reduce students' negative emotions in language learning. On the other hand, teachers can set different learning goals based on students' differences in English foundation, whereas students can choose to complete the assigned learning tasks in the way they prefer. In other words, not only does it enable teachers to educate students in accordance with their aptitude but it also enables students to enjoy success in the process of self-exploration.

5 Practical Application of CAT in English Classroom Teaching Mode

5.1 Subjects and Methods

Taking students from two classes of junior Japanese majors who are studying second foreign language courses taught by the application-oriented university in the region where the author is located as subjects, this research will divide the subjects into two groups to carry out comparative teaching practice, one of which is the experimental group and the other is the control group, with an experimental period of 16 weeks. The students in the two classes are basically the same in English foundation, number of students, and gender. In the control group, teachers will adopt traditional teaching methods to carry out English teaching activities. In contrast, the subjects in the experimental group will accept the interactive learning mode of English teaching. In addition, this research also uses a series of application programs, including Super Star Learning APP, Padlet, and DingTalk, to assist English teaching before, during, and after class, observing the differences in students' learning effects and practical application effects in different teaching modes.

The specific implementation of the research plan is as follows: regarding the course teaching of the experimental group, the teacher will design the interactive tasks before class through computer language-assisted software, teach new course contents and organize interactive activities by multi-modal means in class, and implement a variety of activities after class, such as related interactive evaluation and continuous writing tasks. The schematic diagram of the course implementation is shown below (as seen in Fig. 2).

On the other hand, regarding the course teaching of the control group, the teacher will make full preparations before class and set corresponding course objectives based on the traditional teaching mode, while students will realize the direct interaction between teachers and students and the indirect human-computer interaction with the help of teachers, and carry out group tasks. After class, the teacher will release the course content test and get timely feedback from the students (as seen in Fig. 3).

1) **Teamwork of Pre-class Task Interaction to Mobilize Students' Autonomous Learning Ability.**

In the interactive teaching process, teachers will design pre-class tasks with appropriate difficulty according to the course content, which will be released through Super

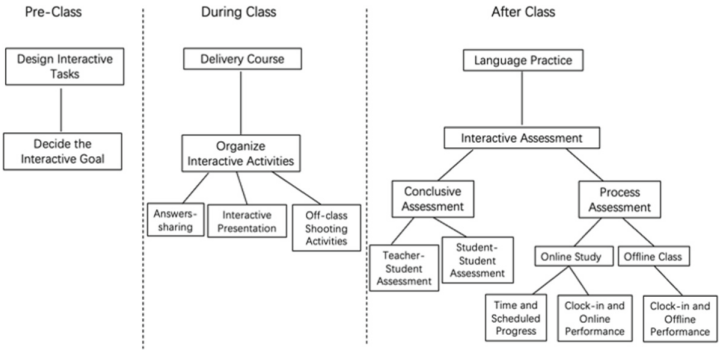

Fig. 2. Interactive Instruction Process with CAT

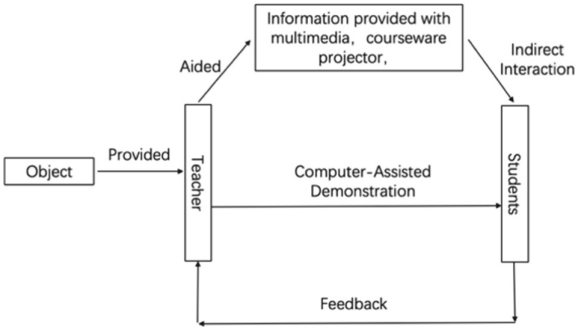

Fig. 3. Classroom Instruction Process with CAT

Star Learning APP. Meanwhile, the abstract learning content will be refined into 3 to 5 small segments, one of which can be completed by students according to their own needs. For example, when teaching *Unit 1 Caring for Our Earth* of the *Experiencing English Integrated Course*, the teacher will assign a group filming task in advance to share the phenomena concerning environmental damage around the campus, and require the students to upload the pictures to Super Star Learning APP in the form of a group with a photo description. Additionally, each member of the group is required to take part in the photo shoot and get their opinions about the environmental damage through communication in the group, which will be further presented by the group representative in the class.

2) **Innovation of In-class Content Interaction to Cultivate Students' Divergent Thinking.**

In this link, instead of rigidly inculcating teaching tasks into students, teachers can carefully design some interactive tasks to allow students to adjust and revise their original cognition through discussion and self-reflection and to master new knowledge and carry out meaning construction by learning from others' strong points and closing the gap. In addition, teachers can combine pre-class tasks to give unit explanations, and use blind

guessing, speeches, performances, debates, etc. to strengthen students' understanding and memory of the content. For example, when teaching *Unit 2 Essence of Brand Building* of this course, the teacher can conduct a brand guessing campaign in conjunction with pre-class tasks. Specifically, the teacher can encourage students to interact with each other to get the right brand answer for 5 to 6 key messages about brands set up by the group. Concurrently, the teacher can set questions about building brand elements on the Padlet teaching software, while students can participate in online interaction through the mobile phone. Also, the students' discussion will be presented on the big screen with vivid words. In this case, the teacher can select several elements to interact with the students.

3) **Diversity of After-class Evaluation Interaction to Construct Students' Meaningful Output.**

In the interest of constructing meaningful learning output and achieving the effect of interactive learning, teachers should fully combine students' subjective initiative instead of sticking to the traditional test feedback method. At the end of the Unit 2 learning, the teacher can use the Crossword platform to make a Puzzle and encourage various student groups to complete the word-filling challenge within the specified time, and the group with the shortest time will win. On this basis, the teacher can make students actively participate in the learning of new knowledge through the incentive mechanism, which will play a key role in the whole course learning.

5.2 Teaching Effect and Analysis

Apparently, students are more engaged in the course when applying CAT in the couse, which can be illustrated from the after-class feedback and presentations. On one hand, students in experimental class are more willingly to response to the tasks given by the teacher than the traditional class, thus participating more and gaining more progress in return. On the other hand, when giving a task of presentation, the works students present from experimental class usually tend to be more creative and persuasive via too-aided approaches while the traditional counterparts are more likely to remain in their comfort zone unable to make a lot breakthroughs and be less persuasive. This can be seen clearly from the overall evaluation after the presentation.

In order to quantify the effect of two different teaching modes, the teacher carried out a research testing the students' learning effect through three examinations before, during, and after teaching by using the testing system of the Super Star Training Platform and a series of intelligent technologies such as grammar evaluation and semantic analysis. The testing content is highly correlated with the teaching content of the teaching materials, with a unified scoring standard adopted. The average scores of the two classes in these tests are as follows (as seen in Fig. 4):

According to the above-mentioned test results, after 16 weeks of the experiment, that the students in the experimental group were 8.4 points higher than those in the control group in the post-test. To be more specific, with the indepth application of CAT in the teaching process, students in experimental class has a better mastery of vocabulary, reading and writing than the control group. Apparently, vocabulary can be retained more efficiently with the assist of CATs since the sense of students can be stimulated and fulfill

Examination	Class	Vocabulary (20)	Reading (30)	Cloze (15)	Translation (10)	Writing (25)	Means
1st Examination	Experimental Class	8.4	15.8	7.4	7	15.3	53.9
	Control Class	8.7	16	6.7	6.6	15.6	53.6
2nd Examination	Experimental Class	12.2	18.1	8.2	9	17.6	65.1
	Control Class	11.9	17.6	7.8	8.6	16.5	62.4
Final Examination	Experimental Class	13.6	19.8	9.8	9.4	19.4	71
	Control Class	11.3	17.2	7.9	9.1	17.1	62.6

Fig. 4. Scores

a coordinated function in the learning process. Moreover, reading and wirting skills can be better trained with the help of CATs for instance the application of online evaluation tools and instant feedback to the assignments through the Internet. In short, the students in the experimental group gradually show a greater degree of improvement in different language skills.

SPSS 24.0 software is used to perform an independent sample *t*-test on the results of the above-mentioned three tests. Through the mean values (x_1, x_2) and the number of samples (n_1, n_2) as well as the standard deviation (S_1, S_2) of two independent samples, the variance t is calculated using the following formula:

$$t = \frac{x_1 - x_2}{S_p\sqrt{\frac{1}{n_1} + \frac{2}{n_2}}} \quad S_p = \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 — 2}}$$

The output results are as follows:

According to the results of Levene's Test for Equity of Variance, the *sig.* Values of the three tests were much higher than 0.05, indicating that the variance t of the average scores

Levene's Test for Equality of Variances				t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
1st Examination	Equal variance assumed	.072	.790	.076	38	.940	.30000	3.92680
	Equal variance not assumed			.076	37.927	.940	.30000	3.92680
2st Examination	Equal variance assumed	.010	.920	.715	38	.479	2.75000	3.84720
	Equal variance not assumed			.715	37.936	.479	2.75000	3.84720
3st Examination	Equal variance assumed	.661	.421	1.855	38	.071	8.65000	4.66272
	Equal variance not assumed			1.855	37.173	.072	8.65000	4.66272

Fig. 5. Independent Sample Test

of the two classes is homogeneous. Therefore, it is sufficient to observe the results of the group with equal variance not assumed. There was no significant difference in the pre-test ($Sig_{(2\text{-tailed})} = 0.94 > .01$) and mid-test ($Sig_{(2\text{-tailed})} = 0.497 > .01$) scores between the two groups, while there was a significant difference in the post-test scores between the two groups ($Sig_{(2\text{-tailed})} = 0.0071 < .01$), indicating that the classroom teaching mode with CAT in the experimental group is superior to the traditional teaching mode in the control group (as seen in Fig. 5). The fundamental reason lies in that most students did not fully adapt to the interactive teaching mode with CAT in the first half of the semester. In particular, students are also faced with challenges from numerous factors, including a large number of online materials flooding into the classroom, the change of their classroom roles, and the constant running-in to build an online learning community, etc. In the second half of the semester, they gradually understood the operation process related to the network learning task and became familiar with the language use scenarios, with which their language expression ability was steadily improved. This further shows that it is meaningful and effective to actively use CAT to develop interactive teaching models in application-oriented universities. In other words, the model is worth popularizing in English class. On the same note, it indicates that the accumulation and acquisition of language knowledge is a step-by-step and gradual process.

6 Conclusion

With computers connecting the whole world, computer-assisted language learning (CALL) has established a reliable language community for students all over the world. Especially, not only can CAT integrate a myriad of teaching resources but it also enables teachers to creatively promote teaching activities. Compared with the practical application of CAT in the west, the introduction of CAT in China lags behind that in the west. Nevertheless, during the process of educational modernization and under the strong impetus of the Ministry of Education, CAT-related research has made quite rapid development. Especially in terms of computer language teaching research and language software development combined with China's national conditions, relevant research has also explored a unique and stable development path for language teaching (Yuan Xinhua, 2014:134–138) [9]. Based on the experiments outlined above, an English interactive classroom can enable students to experience the social attributes of language, and actively construct learning meaning, thereby cultivating students' ability to collaborate and practical application of language. From the perspective of the application-oriented university in the region where the author is located, although computer-aided language software is progressively provided, most teachers lack the knowledge related to the use of software, with the classroom model lacking innovation. Against such a backdrop, the promotion of interactive classroom mode meets the demands of new student groups, and conforms to the fundamental educational philosophy upheld by application-oriented universities, thus effectively delivering bilingual talents with the practical ability for China.

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