

Exploration of the Combination of Online and Offline Teaching of Undergraduate Computer English

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Abstract: In the undergraduate computer English teaching, it is found that the prior knowledge base of undergraduates is uneven, and the cognition of professional English terms of related nouns is different, which brings difficulties to the teaching of this course, resulting in poor teaching effect, and it is necessary to explain the knowledge before it can be carried out in the follow-up teaching. Therefore, the online platform is used to interact with students in real time during the course to ensure that the students' online rate and concentration in the classroom are high, improve the teaching efficiency, and promote the improvement of students' thinking and professional English skills.

Keywords: Computer English; Online Platform; Self-Directed Learning; Flipped Classroom.

1. Analysis of the Current Situation of Teaching

Computer English (bilingual) is an elective course for undergraduate students majoring in Electronic Information Science and Technology, Communication Engineering, and Intelligent Science and Technology. This course is highly professional and interdisciplinary, involving knowledge in multiple subject areas, such as computer science, information technology, network communication, foreign language, etc., which requires students to master the basic knowledge of related disciplines and strong practical ability. The purpose of this course is to cultivate students' professional English skills in the field of computer science, including the comprehension and use of technical terms, the writing and reading of professional documents, and the preparation and presentation

of technical reports. The course focuses on the cultivation of practical skills, including programming skills, writing technical documents, preparing project reports, etc., to help students apply what they have learned in practical work to the greatest extent. In the actual teaching process, the form of bilingual teaching is adopted to help students quickly understand the latest developments in the field of computer and artificial intelligence at home and abroad.

In the past, the method of "teachers teach knowledge, students learn knowledge" was often adopted[1], and the normal teaching process was as follows: teachers teach knowledge points to guide students to make corresponding thinking accordingly, and assign homework with corresponding content (Fig. 1). Students follow the teacher's lecture ideas in the course of class, find their weaknesses in time and improve them, complete the assignment and submit it after class.

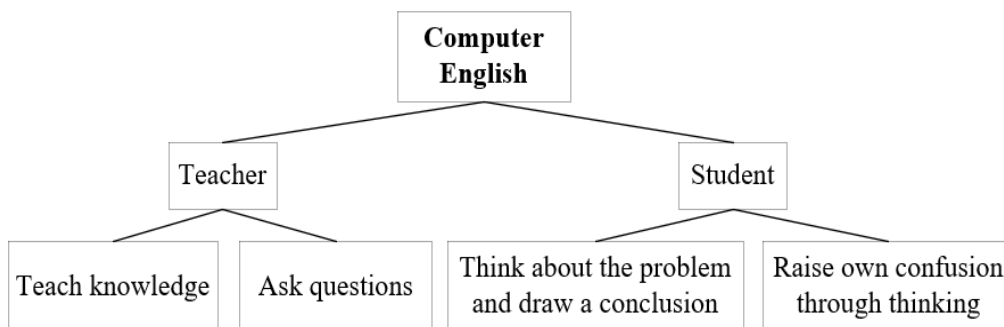


Fig 1. Regular classroom teaching

In the actual teaching process for many years, it is found that students' autonomy and personalized learning in traditional teaching are greatly restricted, which affects students' enthusiasm for learning, and even fails to achieve the expected classroom teaching effect. With the continuous development of contemporary technology and the continuous updating of professional knowledge, the emergence of various teaching platforms has injected vitality into classroom teaching and provided the possibility to change the silence of classroom teaching (Fig. 2). At the same time, higher education has put forward higher requirements for students' independent learning ability, and digital learning ability has

become one of the basic survival skills in contemporary society, and it is inevitable to reform classroom teaching methods. In order to solve these problems, a method combining online classroom with traditional teaching mode is proposed[2].

2. Technology-enabled Teaching Innovations

2.1. Previous Research on Information Technology Empowering Classroom Teaching

At present, the classroom teaching has seen various attempts to improve the teaching process and enhance learning outcomes through the use of information technology. First, a personalized learning system. Utilizing technologies such as artificial intelligence and machine learning to develop systems that provide customized learning content and pathways based on each student's learning style, interests, and ability level, in order to meet the diverse learning needs of students and improve learning efficiency and effectiveness[3]. Second, gamified learning strategies. Integrating gamified elements into instructional design to create interesting and

challenging learning tasks and activities, stimulating students' learning interests, enhancing their motivation and engagement, and promoting the accumulation and application of knowledge. Third, data-based learning analysis. Collecting students' learning data to reveal learning behaviors and patterns, identifying issues, and promptly adjusting teaching strategies and methods to help teachers better understand students' learning status and needs, providing timely guidance and support[4]. Fourth, online learning mode. With the continuous development of the Internet, online education platforms and distance teaching technologies are becoming increasingly mature, providing students with flexible learning methods. They not only offer high-quality teaching resources and course content but also support interaction and communication between students and teachers, thereby facilitating the effective implementation of distance learning[5].

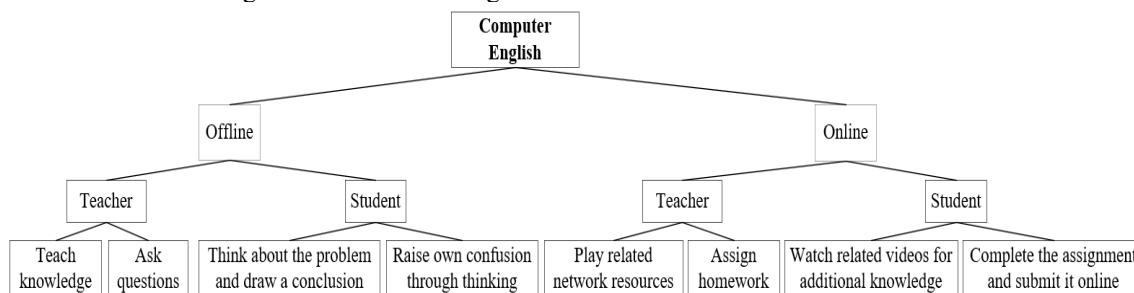


Fig 2. Improved classroom teaching

2.2. The Idea of Information Technology for Computer English Teaching

As a professional elective course, the computer English course has a total of 32 hours. Adopt a diversified assessment model, online classroom performance accounted for 30%, results-oriented education learning training accounted for 30%, final assessment accounted for 40%. For undergraduates, the course is designed to enable students to master basic computer knowledge and professional vocabulary in the field. At the end of the course, students are required to be able to describe the development process related to computers, have certain professional English expression skills, and be able to consult the latest Chinese and English materials in the field.

Deep learning is the ability to learn and think critically on the basis of understanding relevant knowledge, to combine old and new knowledge, to establish links between knowledge, and to build their own knowledge framework. It is an ability to apply already learned knowledge into the new environment, making reasonable decisions and solving actual problems[6]. At present, deep learning puts higher demands on undergraduates and teachers. For undergraduate student, first of all, they need to possess critical thinking skills, which involve evaluating and selecting knowledge and information. Simultaneously, they should organize, summarize, and integrate these insights to construct their own mental maps, thereby establishing connections between new and existing knowledge. Secondly, it is necessary to have the ability to apply knowledge and solve practical problems[7]. Finally, the process of learning knowledge and solving problems should be expressed. The ability to express oneself accurately is both a test of undergraduate students' learning outcomes and a different form of knowledge transformation. For teachers, first of all, they should select the learning content and choose

the appropriate knowledge with greater relevance to arrange the teaching tasks. Secondly, teachers need to make a preliminary judgment on the learning ability of undergraduates, formulate reasonable learning goals, provide effective resources and help to guide undergraduates to further study. Furthermore, there should be a supervisory process to guide undergraduate students in the right learning direction, better stimulate their passion for learning, and promptly identify and solve any problems they encounter. Lastly, it is important not only to pay attention to undergraduate students' understanding of knowledge but also to focus on whether they possess the ability to apply this knowledge and to cultivate their ability to solve problems independently.

The outbreak of the COVID-19 pandemic has compelled schools to gradually transition to online classroom teaching to meet educational progress and tasks, also enabling teachers to better understand and utilize online resources for teaching. At present, the epidemic has ended, and teaching activities have returned to the traditional teaching methods before the epidemic. However, it has been observed that traditional offline teaching lacks the ability to receive timely feedback from students' participation and does not provide a direct understanding of basic factors such as student attendance. Based on the above reasons, the combination of online and offline teaching methods are adopted. Take the content of a class as an example (Fig. 3), in the actual teaching process, online platforms (such as: learning) can be assisted to better grade students' homework and normal performance. According to the background data, students' homework submission can be understood. Objective questions can directly know students' accuracy rate. Subjective questions can set some keywords, and students' homework can be scored by identifying whether there are matching keywords

and the matching rate. On the learning platform, learning tasks such as watching relevant 'MOOC' videos are assigned with specific deadlines, extending the classroom knowledge.

After the task is completed, the backend data can be shown whether any students have not completed the learning assignments.

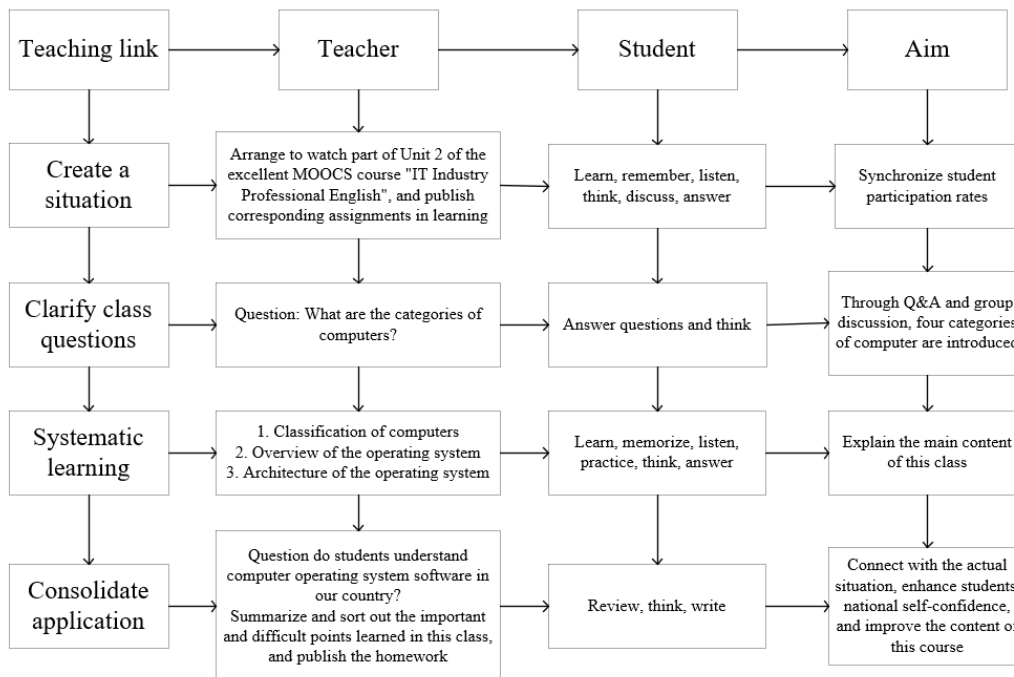


Fig 3. Teaching process.

3. Teaching Process of Technology Empowerment

3.1. Before the Class

Pre-class homework will be published through the learning platform before class, so that students can have a preliminary understanding of the content of this class before class, and

come to class with the problems encountered in the preview. Taking the class participation of 2020 undergraduate students as an example, questions related to the class content are posted on the learning platform (Fig. 4). Each module and video is accompanied by corresponding introductory questions, which students answer after completing their preview work. This allows for a direct view of the students' preview situation.

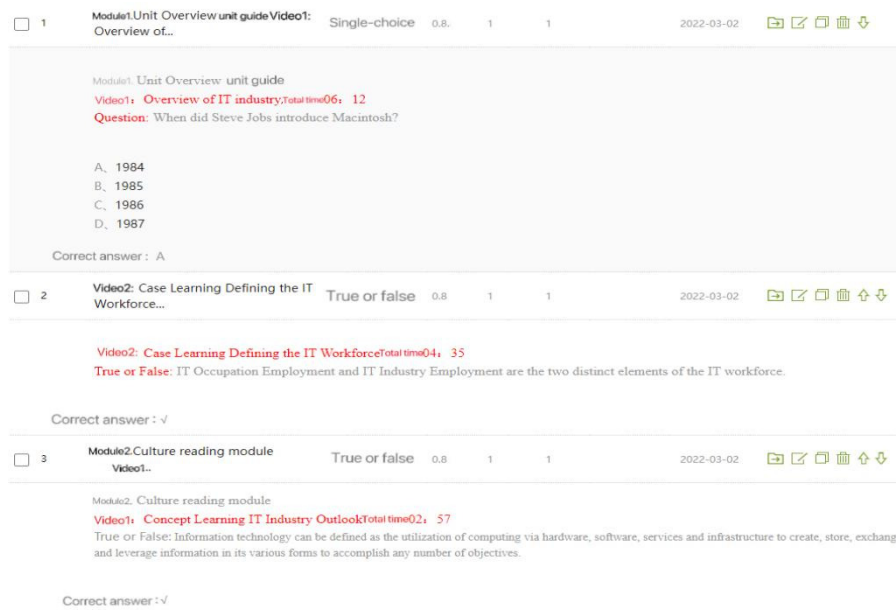


Fig 4. Post questions about importing class content before class

3.2. During the Class

In class, you can first use the sign-in activity of the Learning platform. Taking the sign-in activity of undergraduates in grade 2020 on May 19 as an example (Fig. 5), you can check the attendance rate of students. It can be

seen that three students did not check in on time, and one of the students received a status notification indicating that the check-in has expired. So, teachers can confirm the actual situation of the student by roll call in class. Through the combination of online sign-in and offline roll call, each student's attendance status can be guaranteed.

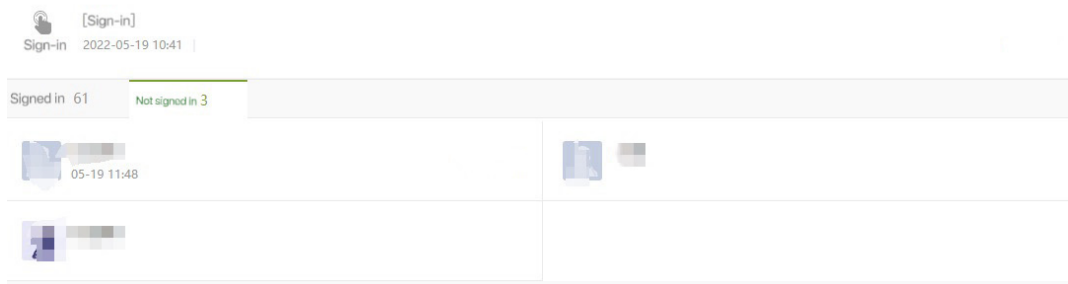


Fig 5. Check-in on May 19

Before the formal lecture, the question "What is Vector processing?" is asked and the concept of Vector processing is introduced through questions and answers. Then detailed explanation will be given on the relevant knowledge of Vector processing, World Wide Web Services, E-mail services, File transfer services, Cloud computing services and Internet of Things. In the course of explanation, it can be found that the relevant knowledge of Cloud computing services and Internet of Things is the key and difficult point of this course. Therefore, by assigning real-time interactive learning tasks and homework on the platform, students' enthusiasm can be stimulated and their participation rate increased, ensuring that their attention remains focused on the course content.

In addition to the course content, integrate elements of ideological and political education to enhance students' national confidence, introduce China's email services, and let students watch related videos. According to the actual work

needs in the future, teacher will play the "MOOC" course to learn the relevant workplace English in the IT industry. After students finish watching the video, the teacher will post related questions on the learning platform. The teacher can clearly see the students' completion status, with 50 students answering correctly and 12 students answering incorrectly. You can quickly know the number of students who do not participate in class work in time, and visually check the correct rate of students' answers.

The statistical details can be presented in four ways: bar chart, pie chart, histogram and line chart. Taking the bar chart as an example, we can see the number of people who choose 4 options (Fig. 6). The number of students who choose option D is the largest, up to 80.65%. The students who chose C were the least, accounting for 3.23%, and the number of students who choose option A and option B is equal.

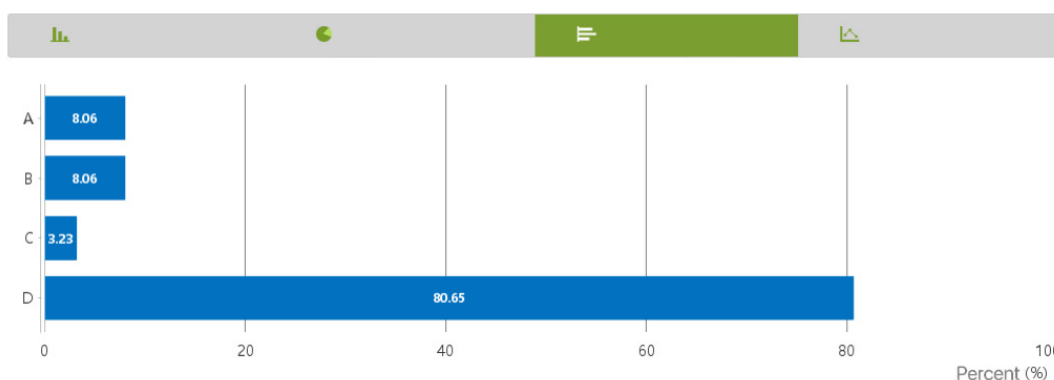


Fig 6. The data of the answers to this question

At the end of the class, the content of this course is summarized, and the key points and difficulties of the course are emphasized. Homework is assigned on the study pass, so that students can further consolidate the knowledge after class, and students are required to upload the completed homework through the learn platform [8].

3.3. After the Class

The exercises published after class are mostly objective questions, and the system can quickly get students' answers and give the correct rate. The homework published after class is mainly subjective questions. The system obtains a large number of keywords related to the topic given by the teacher, extracts and identifies keywords from the students' homework. The system rates students based on the percentage of overlap in their assignments.

Students' homework is submitted to the system within a specified time. After the task is completed, the system can check and compare the homework submitted by each student

to draw a conclusion of similarity (Fig. 7). The homework of the following four groups of students is highly similar, and it is necessary to check the content.

The content of students' assignments is compared with the keywords set by the system, and based on the percentage of overlap, all students are divided into four levels. An overlap rate greater than 90% is classified as Grade A, indicating that the essay fully addresses the topic. Students with an overlap rate between 80% and 90% are classified as Grade B, indicating that the essay is missing some key content. Students with an overlap rate between 60% and 80% are classified as Grade C, indicating that the essay only partially addresses the topic. The students with an overlap rate of less than 60% are classified as Grade D, indicating that the essay is off-topic and the performance is unsatisfactory. The teacher refers to the rating results provided by the system to give the final score for the students' assignments.

Final assignment

Similarity screening > 30.0% Screen

Number	Student1	Student2	Similarity
1			100.0% View details
2			100.0% View details
3			100.0% View details
4			100.0% View details

Fig 7. Conclusions on the similarity of student assignments

4. Teaching Effect and Reflection of Technology Empowerment

By making full use of resources such as online platforms,

we can get students' usual scores as a reference (Fig. 8). The full score of daily homework is 50 points. Taking the scores of some students as an example, we can see that the highest score is 48.67 points and the lowest score is 47.35 points.

Student name	Student number	homework (50%)	exam (50%)	Comprehensive score
		48.67	0.0	48.67
		48.67	0.0	48.67
		48.45	0.0	48.45
		48.23	0.0	48.23
		47.79	0.0	47.79
		47.79	0.0	47.79
		47.79	0.0	47.79
		47.35	0.0	47.35
		47.35	0.0	47.35
		47.35	0.0	47.35
		47.35	0.0	47.35
		47.35	0.0	47.35

Fig 8. Some of the students' usual grades

It can be seen from the summary of students' usual scores (Fig. 9) that 67.19% of students scored between 40 and 60 points, and only 3.12% scored below 20 points. It can be

concluded that most students have a relatively high class participation rate and a good overall completion.

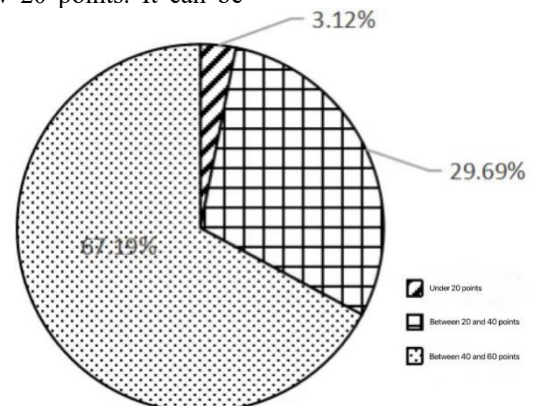


Fig 9. An overview of grades

The comprehensive score of each student is given based on the result of the course final examination (Fig. 10). It can be seen that there is a proportional relationship between the peacetime score and the comprehensive score. The online platform provides the basis for students' peacetime score, and

the higher the students' peacetime score, the higher the corresponding comprehensive score. Even if the student's final exam score is not satisfactory, the student can successfully pass the course exam with the aid of normal grades. Therefore, the combination of online and offline

teaching methods is helpful to improve students' achievement.

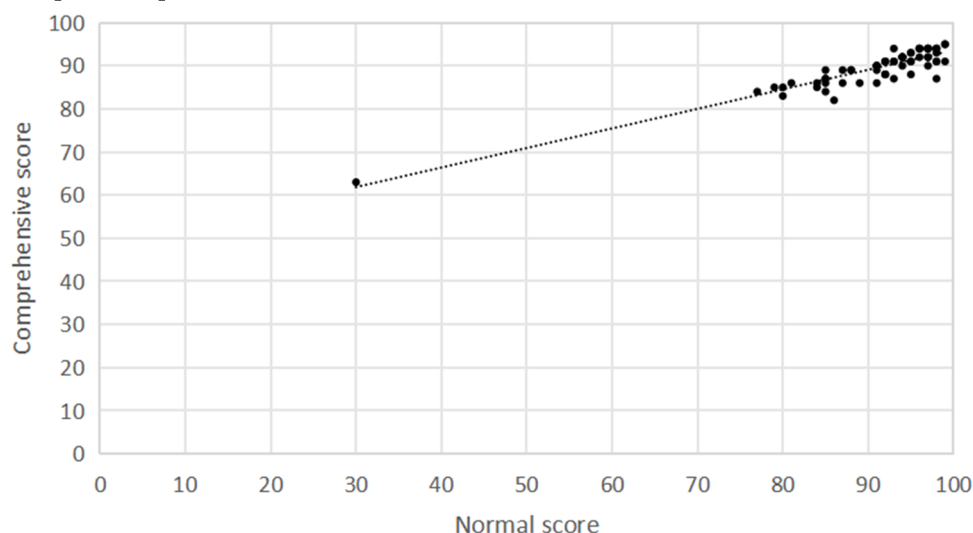


Fig 10. A scatter plot of the correlation between usual and comprehensive grades

When operating the online platform, it was found that there were still some problems, such as students' late sign-in and teachers' manual help was needed. The scoring system of subjective questions is not perfect, which may miss some key words, which will affect students' performance. These problems need to be gradually improved in the future teaching process in order to improve the teaching effect.

After teaching reflection, it can be found that the traditional teaching mode is boring and students' independent learning ability is relatively weak, so it is necessary to have the requirements of homework to stimulate students' learning initiative and enthusiasm[9]. Therefore, the combination of online platform and computer English course teaching is adopted to give full play to the advantages of online platform and explore the benefits this mode brings to students in the teaching process, so as to improve students' independent learning ability and the ability to explore knowledge[10].

Computer English is taught in two languages. Through teachers' teaching, students' discussion, online and offline mixed teaching methods, it can effectively strengthen the key points of learning, resolve difficulties, and expand students' knowledge. Using information teaching means, such as multimedia courseware, online learning platform, etc., to improve students' learning effect and independent learning ability. With the globalization of computer science and technology, computer English courses should focus on cultivating students' international vision and cross-cultural communication ability, so that they can carry out academic exchanges and cooperation in an international environment. With the rapid development of the computer field, related technologies and terms are constantly updated, so computer English courses need to keep updated and iterative, and timely adjust the teaching content and methods to meet the needs of the development of the industry.

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