Technology-supported High-order College English Teaching and 21st Century Skills

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Abstract: As a compulsory course, College English should not only help students master professional knowledge, but also promote the development of their comprehensive qualities, cultivating high-quality and innovative talents who can meet the needs of times. 21st century is an era of digitization and globalization, which places high demands not only on students’ English language skills but also their non-cognitive skills of communication, collaboration, critical thinking, and creativity as well as their digital literacy. Based on knowledge and aiming at improving students thinking mode and abilities step by step, high-order teaching emphasizes the facilitation of students' critical thinking and creativity through a combination of teachers' higher-order teaching and the students' deep learning through various teaching methods. This article aims to investigate whether technology-supported high-order College English teaching can foster students' 21st century skills gradually in one class. A teaching practice was conducted for freshmen major in journalism and the results confirm the positive role of technology-supported high-order college teaching in fostering students' 21st skills.

1. Introduction

College English is one of the significant compulsory courses and its development can be traced back to the 1920s when China opened its door to western culture and education. At that time, chalk and blackboard was enough for College English teaching. However, dramatic changes have taken place in the last century and college English has to reform for its survival[1]. The main characteristics of 21st century are digitization and globalization. Under this background the goal of college English as a public basic course should not be solely on developing students' language skills like listening, speaking, reading, writing as modern society needs people to be equipped with 21st century skills (e.g., critical thinking, creativity, communication, digital literacy, or collaboration skills)[2].

With the development of technology, teaching methods have undergone dramatic changes and technology's impacts on language teaching have been proven by many scholars through various studies. Eaton (2010) claimed that computer-based communication was a useful feature for language learning as computer-assisted discussion features more equal participation than face to face discussion.[3] Baytak, Tarman, and Ayas (2011) confirmed that students' learning was improved by integrating technology into the classroom for technology made students' learning interesting and interactive and increased their motivation, social interactions, and engagement.[4] Costley concluded that follow-up discussions supported by technology can facilitate students' independence.[5] Srebnaja and Stavicka (2018) integrated learning management system WebQuests in their teaching and the result indicated that, in addition to improvement in speaking, grammar and writing skills, students' creativity, innovation, collaboration, communication, as well as digital literacy were enhanced.[6] Girgin and Cabaroglu (2021) used classroom interactive tools including Quizlet, Quizizz, Cram, Kahoot and creative tools of Story Bird, Voki, Go Animate, Animoto, Powtoon, Canva, Poster MyWall as well as collaboration tools Padlet in their teaching and found that students' 21st century skills of collaboration, critical thinking, creativity, innovation and communication were fostered.[7] Yang et al. (2022) applied creative tools Audacity, collaboration tools Google Drive, and presentation tools Prezi in their study and the result showed that students' 21st century skills of creativity and innovation were promoted.[8] Nikitova et al. (2020) utilized multimedia textbooks in their teaching and found that students' 21st century skills of collaboration, critical thinking communication, and problem solving were facilitated.[9] Jamalai and Krish (2021) used the online forum ODF to conduct online topic discussion, and concluded that students' 21st century skills of critical thinking and digital literacy were enhanced.[10]

It can be concluded that technology plays a positive role in fostering language students' 21st century skills of communication, collaboration, critical thinking, creativity as well as enhancing their digital literacy. But little was known on how to facilitate those skills step by step in one class and the present study attempts to address this gap through high-order teaching.
2. High-order teaching

The success of a class is determined not only by the teacher's teaching but also the students' learning. This article holds that the fostering of students' 21st century skills is inseparable from both the teacher's high-order teaching and the students' deep learning. To be specific, when conducting high-order teaching, the teacher should seek methods to induce students' deep learning. The following part is a brief introduction to frameworks of high-order teaching and deep learning proposed in 2020 by Guangyan Zou, the founder and perpetual president of Chengdu Jincheng college.

2.1. High-order teaching framework

The framework of high-order teaching can be summarized as "one foundation, two axes, and three orders of progression" [11]. Here foundation refers to knowledge and one foundation means that teaching should be based on knowledge; two axes refer to students' thinking mode and abilities which are supposed to be developed during the teaching process; three orders refer to low order, medium order and high order and "three orders of progression" means that the development of students' thinking mode and abilities should start from low order, then gradually move on to medium order and finally reach high order.

The idea that educational objectives can be arranged in a hierarchy order was put forward by Bloom. In his *Taxonomy of Educational Objectives: The Classification of Educational Goals. Handbook I: Cognitive Domain*(1956), Bloom claimed that educational objectives should be achieved successively from knowledge, comprehension, and application to analysis, synthesis, and evaluation [12], which was later revised by Anderson and Krathwohl (2001) into from remember, understand, apply to analyze, evaluate, and create [13] with nouns being replaced by verbs and the orders of the highest two levels being reversed.

Inspired by Bloom's taxonomy, the high-order teaching framework holds that both students' thinking mode and abilities can be divided into three levels, i.e. low order, medium order, and high order. Low-order thinking mode refers to receptive thinking and deducing thinking; medium-order thinking mode refers to correlative thinking and migrating thinking; high-order thinking mode refers to critical thinking and creative thinking which are significant 21st skills. In terms of abilities, low-order abilities mainly involve memorization and comprehension; medium-order abilities are characterized by solving general problems of individual items by analogy while high-order abilities are featured by coping with complex problems through multiple solutions. Under the framework of high-order teaching, teachers should strive to gradually develop students' thinking mode from receptive and deductive to correlative and migratory and finally reach the level of being critical and creative, enabling them to start from just memorizing and comprehending to having the ability to solve similar problems using analogy and finally being able to come up with multiple solutions to tackle complex problems.

2.2. Deep learning framework

The acquisition of high-order thinking mode and abilities cannot be achieved without students' deep learning. The framework of deep learning can be summed up as "One point, two sides, three focuses, and five evaluations" [11]. One point means that the basic goal is to train talents with the competitiveness and core competencies necessary in the 21st century; two sides refer to high-order teaching and deep learning which are the two aspects for the achievement of the "one point"; three focuses include external causes, inner causes and coordination concerned with students' learning; the five evaluations involve students' active learning, their devotion to learning, their methods of learning, their achievement of three orders of progression, and their innovation.

To promote students' deep learning, the teacher is supposed to adopt different teaching methods at different stages of teaching and learning. At the low-order level, students are passive learners who set out to understand and memorize knowledge. During this period of time, the teacher can use teaching methods like lecturing or use online resources like Mooc to facilitate students' understanding of the teaching material. After having a clear understanding of the knowledge being taught, students move on to the next stage of medium-order learning. In this process, the teacher can adopt teaching methods such as problem-oriented teaching method or case study to promote the transition of students' learning from being passive to active. Teaching methods such as brainstorming, project-based learning, and promoting learning through competition can be used to foster students' critical thinking and creative thinking as well as turn students' active learning to deep learning and cultivate their ability of solving complex problems through different ways.

In the following part, this article conducted a high-order teaching practice with the help of technology to investigate whether technology-supported high-order College English teaching can foster students' 21st century skills step by step in one class.

3. The Current Teaching Practice

Participants of the current teaching practice are all freshmen major in Journalism. They were born in the 2000s and Internet is the main means for them to obtain information. As Journalism majors, they are interested in hot topics happening around them. The class size is 46, with 36 girls and 10 boys. That is reasonable as Journalism is a major belonging to the humanities. The teaching material chosen for this course is New Advanced College English Integrated Course Book1 published by Shanghai Foreign Language Education Press and the current practice revolved around Unit one Stepping Out of Your Comfort Zone. Under the framework of high-order teaching and deep learning, this
teaching practice was divided into three parts: before class, in class, and after class.

3.1. Before class
As mentioned, teaching activities integrated with the use of technology can facilitate students' learning process. However, in order to be effective, the type of technology being used must be in line with the students' ability. If the technology is too complicated, students may become frustrated while too easy technology may lead to the losing of students' interest. For this teaching practice, technologies like platform-based flipped classroom Jicheng Online (an online platform specially developed for the students of Chengdu Jincheng College), multimedia materials, learning management system Xuexitong and its online theme discussion forum, presentation tools PowerPoint, as well as social communication tool WeChat were used.

Besides appropriate technology, suitable teaching materials are of equal significance to the effectiveness of teaching. Before the class, students had been required to finish an online Vocabulary Size Test by Paul Nation to assess their vocabulary level. This test contains 140 multiple-choice items, with 10 items from each 1000 word family level. A learner's total score needs to be multiplied by 100 to get their total receptive vocabulary size.[14] Results showed that the average vocabulary size of this class is 4167, with the highest score being 5700 and the lowest being 2000. It can be seen that the difference in the students' vocabulary size is significant and the average level is slightly lower than the requirement of CET4.

Before the class, the students had been assigned to check the meaning of the words on a given vocabulary list and to finish the corresponding flipped classroom on Jincheng Online. The vocabulary list contained possible new words that would be necessary for the understanding of teaching materials used in class. Flipped classroom is student-centered and can utilize students' active learning and collaborative learning more fully.[15] The contents for this flipped classroom included a video clip from VOA Learning English on the definition of comfort zone and an article entitled 10 Ways to Step Out of Your Comfort Zone. After watching the video clip and reading the given article, students were required to fill in the blanks in a given table concerned with their own comfort zone and ways to step outside their comfort zone. This pre-teach process was supported by platform-based technology and belonged to low-order teaching which exercised students' receptive thinking and deductive thinking as well as emphasized students' abilities of understanding and memorizing.

3.2. In class
After a warming greeting, the teacher posted an online assignment on the theme discussion area of Xuexitong, requiring students to brainstorm words or expressions related to comfort zone. The time limit is five minutes and an online timer provided by Xuexitong was used to let students be aware of the time. The students' answers were then presented in the form of word cloud. This task was a way to check students' flipped classroom study and helped students to share their ideas freely.

Then, the students were required to answer the following three questions by drawing a picture on their smart phone: 1) What are the characteristics of comfort zone? 2) What will happen if people stay in their comfort zone? 3) What process does it take to step out of the comfort zone? After finishing drawing, students posted their pictures in the class WeChat group and students gave comments on their peers' work. This question-oriented task was designed to develop students digital literacy as well as foster their critical thinking. Students were supposed to complete this task using the knowledge they acquired in the previous process, thus enhancing their deductive and correlative thinking which belong to low-order thinking mode and medium-order thinking mode respectively.

After that, a video clip concerned with the news of Luckin's cooperation with Moutai was presented to the students through the multimedia. The reason for choosing this teaching material was that the target students are Journalism majors who are interested in hot news and they are familiar with Luckin and Moutai. The video news was scripted and new words appearing in it had been given to the students for checking their meanings. After watching the video, students were first invited to talk about Luckin's comfort zone and its efforts to step out of it. They were required to voice their answers and sent them to the class WeChat group. During this process, students' medium-order thinking mode of relative thinking and migratory thinking and their speaking skills were supposed to be promoted. Then the students were divided into groups to discuss if there were other possible companies Luckin could cooperate and to predict the cooperation results, including both its advantages and disadvantages. Then, each group presented their teamwork in the form of written news report on Xuexitong's theme discussion area. Other groups were required to question and comment on their peers' work and then scored (full score 100 points) the news report after discussing with their teammates. The group with the highest average score was the winner. Finally, the teacher commented on the students' performance and gave instructive suggestions. This was a project-driven task and in order to accomplish it students had to brainstorm to come up with creative solutions through which their creativity was fostered. Through completing tasks with a team, students' communication and collaboration skills were promoted by discussion.[16] Meanwhile, students' critical thinking was promoted as they gave critical and constructive comments to other groups' work [17]. The learning process was also promoted through competition.

3.3 After class
After the class, all the teams were assigned the task of making a video clip to report their news like a reporter. Clear description of the requirements were given to the
students including its frame, dubbing and subtitles. For
the sake of completing this task, students had to learn
advanced digital technology so as to create exquisite
video clips. Relevant resources were uploaded to the
learning management system Xuexitong and students
were encouraged to study those materials at their own
pace after the class. Their learning behavior was tracked
by the system for the teacher's reference.

4. Analysis on the teaching effectiveness

After the teaching practice, a survey was conducted to
verify the effectiveness of this technology-supported
high-order College English teaching. To be specific, a
questionnaire and an open interview were adopted to
gather students' feedback towards this new teaching
mode. The results are as follows.

The questionnaire covered several aspects such as
students' language skills of listening, speaking, reading,
and writing, their 21st century skills of communication,
collaboration, critical thinking, and creativity, and digital
literacy as well as their overall satisfactions of this
teaching practice. The results showed that students' overall satisfaction for this class was 93.9% and their
satisfaction rates towards different types of skills
improved ranged from 84.1% to 91.5%. From the
perspective of language skills, 86.6% of the students
considered their listening skills were effectively
enhanced while 87.8% of them felt their speaking skills
were significantly improved. The percentages of students
who thought their reading skills and writing skills were
greatly facilitated were the same, accounting for 85.4%.
In terms of 21st century skills, 91.5% of the students
believed their communication and collaboration skills
were significantly enhanced while 89% of the students
considered their critical thinking was noticeably fostered
and 84.1% of the students thought their creativity was
distinctly facilitated. As for digital literacy, 91.5% of the
students claimed that they were better at accomplishing
assignments with the help of technology.

In the open interview, some students expressed that
technology-supported high-order College English
teaching improved their subjective initiative in learning
English. They could study the online materials at their
own pace and they were able to study those materials
repeatedly until they had a thorough understanding.
Some of them mentioned the gradual increase in learning
difficulty helped them better adapt to the teaching
contents and their skills and abilities were improved
gradually. A few students pointed out that some students
were not cooperative during this process which made it
not easy to finish the assigned task.

5. Conclusion

In the 21st century, with the development of technology,
the society needs people to have basic digital literacy
and be equipped with the skills of communication,
collaboration, critical thinking, and creativity.
Accordingly, as an important public basic course,
College English teaching should not only focus on the
development of students' language skills but also on the
promotion of their 21st century skills. The teaching
practice conducted under the guidance of high-order
teaching and deep learning frameworks effectively
facilitated students' language skills, developed their
thinking mode and abilities from low order, to medium
order, and finally reached high order with the help of
modern technology including platform-based flipped
classroom, multimedia materials, learning management
system, presentation tools as well as social
communication tools. During the process, students
learned to take initiative in learning; they devoted a lot
of time and efforts not only in class, but also before and
after class; they used the scientific methods of
collaboration, inquiry, and interdisciplinary to finish
their task, and their creativity was developed by coming
up with new solutions to solve complex problems. As a
result, their 21st century skills were fostered.

However, when conducting this kind of teaching,
teachers should be aware that although learners have
been born into a technologically rich world, they may
not be skilful users of technology[18] and the choice of
technology should be in line with the skills to be fostered.
In addition, teachers should select teaching materials
related to students' life and study, give clear instructions
to students' tasks, monitor the progress and provide help
when needed so as to ensure all students are involved.

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