Research of English Teaching and Learning Methods Based on Constructivism Theory Assisted by Multimedia

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Abstract

Whether the multimedia instruction of English teaching is successful depends on not only the development of multimedia software but also the use of multimedia teaching applications and curriculum design. Nowadays the hardware conditions of computer have been mature and English teaching and learning software are more than enough, but in fact the phenomenon that there might be lack of English teaching theories and inappropriate curriculum design may exist. The paper herein will discuss the constructivism theoretical basis of English teaching and learning assisted by multimedia and its guiding functions in practice according to the results of the related investigation. Moreover, it will also complete the curriculum design of multimedia software under the instruction of the theory and do the statistical analysis of the evaluation results of English teaching and learning assisted by multimedia under the guidance of constructivism theory. The results show this kind of method will improve students' self-regulation of learning and enhance the teaching quality, which has a strong practical significance to improve the teaching method of English.

Key Words: Multimedia Assistance, Constructivism Theory, English Teaching and Learning, Curriculum Design

1. Introduction

Multimedia computer system now can achieve various multimedia capabilities simultaneously that may only be realized by many devices in the past. This kind of information technology integration may make most of the computer assisted instruction courseware be capable of using the information organization structure mode of hypertext and hypermedia. Multimedia technology may integrate the learning medium like image, text, voice and video organically to build a virtual real world, which may achieve the interaction between learners and computer and the self learning of learners. "Interaction" and "self-determination" may serve as the significant advantage or feature.

However, to learn English assisted by multimedia doesn't serve only for English teaching. The knowledge of voices, meanings of words, communications with language and cultural backgrounds share the relevance and complementariness in the process of English learning, which will make the engagement of multimedia enlarge the environment of English learning and increase the chances of language acquirement.

Normal language laboratories can achieve general exercises of listening and speaking and most of the language laboratories are equipped with computers, but that doesn't mean the realization of multimedia teaching or multimedia. Because these medium are separate from each other and furthermore resources are not optimized and organically integrated into a concentrated mode. The display of teaching and learning design and theory may exist during the process of teaching and learning.

Firstly, the paper herein assumes that theories of cognitivism and constructivism may be more suitable for multimedia teaching. Moreover, the form of teaching and learning will go back to its old way and generate conflicts between means and method, if we use the multimedia teaching and learning coursewares assisted by computer but still under the guiding principle of behaviorism. The coursewares of multimedia English teaching and learning and multimedia assisted teaching should value more on their teaching design and make themselves suitable for the learning concept of constructivism. Although the theory of constructivism may not instruct the teaching theory directly, its concept of learning will bring theoretical basis and new practice pattern to teaching, especially for multimedia teaching. Secondly, the content of multimedia coursewares should possess selectivity and scalability. Finally, we should guide students to change the ways of learning and increase learning motivation in a larger extent in order to implement teachers' new teaching and learning mode of man-machine interaction on the basis of the two points mentioned above.

2. Investigating of the practice of multimedia teaching and learning

2.1 Teaching and Learning Process

To teach and learn by multimedia English coursewares, in some extent, means the extinction of traditional pattern of English courses. At this time, the boundaries among intensive reading, extensive reading and listening
and speaking course may not be that obvious. The optimized integrating reading, writing, listening, speaking and translating with various medium of image, text, voice and video may create a new pattern of learning. As long as you stick to the program that you have already set during the process of teaching and learning, the entire teaching activity will continue according to the pattern. The English teaching and learning assisted by multimedia may generally take following guiding principles:

1. To choose teaching discs with rich content and strong navigability;
2. To take various kinds of ways and balanced and practical teaching methods and strategies to teach;
3. To integrate the multimedia with internet. Multimedia softwares made by discs may have less space and limited choices. We can use our own network navigation system in computer room.
4. The interaction between teacher and student; Teachers can communicate with students online and check the homework.

2.2. Investigation Target
The targets of the investigation are 44 students from science and engineering school of one university. We investigate the basic situation, knowledge of computer and the interest of multimedia assisted English teaching of them before studying the discs. The background of these investigation targets will be illustrated in the following Table 2-1.

<table>
<thead>
<tr>
<th>Table 2-1. Background of Investigation Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Middle School</td>
</tr>
</tbody>
</table>

2.3. Investigation Process
There will be 5 average periods every week and 2 of them will be assigned to make students study the content on the discs on their own in the multimedia classroom. Every student has a set of discs. Investigators will answer their questions when they meet in their study at any time. Students are requested to finish specific study tasks such as preparation, review or finding the answers to the questions that investigators request every time when they learn by discs. Students will be asked to write down the feelings of studying on the computer every time and the learning process as well. After two months and a half learning, students will be asked to fill in another questionnaire which is made up of six parts. There are 13 questions in the first part which may mainly focus on the students’ attitude towards studying English by computer. The other five parts may aim to investigate students’ attitude towards the discs they are using and the other five parts in order that investigators can evaluate each part of discs from the angle of student.

2.4. Results of Investigation
Mentioning students’ attitude towards multimedia assisted English teaching, firstly we will count the score frequency of each attitude towards each question of the first part of the questionnaire and then make the following figure 2-1. From the diagram, we can see that most of the respondents’ attitude towards multimedia assisted English teaching is positive. Then we calculate the mean value of each question and arrange them by score from high to low, the questions with higher and lower scores will be showed in the following Table 2-2 and 2-3.
According to the results of the statistics above, questions with higher mean values conform to the related theories that predecessors have made on multimedia assisted English teaching. Furthermore, the current research shows that multimedia assisted teaching has an active impression on study motivation. 

(1) New media may bring sense of curiosity; 
(2) Computer assisted teaching shares personalized features; 
(3) It will provide more chances of self-learning for learners; 
(4) Multimedia study will bring frequent feedbacks.

On the contrary, there are two questions referring to the communication between men in questions with lower mean values. There will be something that we can find in the after-class records of students. What students reveal most is that they may lack communication when they are using the discs. It follows that although multimedia language learning can train listening, speaking, reading and writing all, it still fails to integrate meaningful and real communications into the process of learning (at least, the multimedia language learning pattern we are using). We believe that network language teaching may deal the problem well. How to make learners have meaningful and real communication while new educational technology is been using on the teaching of language will be a significant topic in the future.

2.5. Summary of Results

Generally speaking, students' attitude towards the disc's enjoyment and effectiveness is positive. When talking about each part of the disc, the explanation part of text is assumed to be the most effective and the additional exercises are the most interesting. On the contrary, students think the effect of exercises is the poorest and the explanation of grammar is of least fun. 88.4% of students think content and interface of the disc are

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**Diagram 2-2. Questions with Higher Mean Values**

<table>
<thead>
<tr>
<th>The subject of investigations</th>
<th>AVG</th>
</tr>
</thead>
<tbody>
<tr>
<td>I want to continue to use computer in English class</td>
<td>4.82</td>
</tr>
<tr>
<td>I can learn English independently by using computer</td>
<td>4.57</td>
</tr>
<tr>
<td>It is depressed to learn English by computer</td>
<td>4.39</td>
</tr>
<tr>
<td>It is more interesting using computer to learn English</td>
<td>4.15</td>
</tr>
<tr>
<td>The computer will control my English study by myself</td>
<td>4.08</td>
</tr>
<tr>
<td>When I used computer to learn English, I feel more relax</td>
<td>4.04</td>
</tr>
</tbody>
</table>

**Diagram 2-3. Questions with Lower Mean Values**

<table>
<thead>
<tr>
<th>The subject of investigations</th>
<th>AVG</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have more opportunity to communicate with teachers by computer</td>
<td>2.98</td>
</tr>
<tr>
<td>I have a sense of achievement by using computer learn English</td>
<td>3.15</td>
</tr>
<tr>
<td>The computer isolated me and the classmates</td>
<td>3.27</td>
</tr>
<tr>
<td>The speed of learning English increase fast by using computer</td>
<td>3.27</td>
</tr>
<tr>
<td>The computer bring me more chances for practicing English</td>
<td>3.35</td>
</tr>
<tr>
<td>I have more harvest by using computer learn English</td>
<td>3.48</td>
</tr>
</tbody>
</table>

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Figure 2-1. Statistical Chart of Score Frequency of Attitude Towards the Questionnaire
funny, but 39% of students think they are less helpful to the improvement of reading comprehension. For students who use the multimedia assisted English teaching for the first time, there are one-third of the students who hold the negative attitude towards it. The percentage is pretty high. We think the problem might contribute to the way of using multimedia. Students might think it lacks humanistic spirit, which shows not only students still rely on the traditional learning pattern but also most of teachers keep a conservative attitude of views and values.

2.6. Analysis of Results
The results should be compared and analyzed with the real situation. In fact, multimedia assisted teaching is built only when learning and computer are integrated for a long time. But actually computer assisted English teaching can no longer summarize the multimedia English teaching assisted by computer. The reasons can be showed as followed. The process of multimedia English teaching is not a single teaching pattern assisted by computer. It differs from the multimedia technology that is used on mathematics, physics and chemistry. These subjects may only utilize the function of computer’s multiple way of display to help learners to understand scientific principles and simulate science event, however, the development of English learning has already exceeded this field.

Constructivism, labeled as the psychological theory of post-structuralism, may regard learning as the positive process between of the communication between the learner and the outside society. During the process, the learner will explain the cognitive object continuously and build his (or her) own knowledge hierarchy. Constructivism believes that knowledge can’t be imparted but built by the learner, which is the process that the learner builds his (or her) own knowledge hierarchy gradually by means of not only the interaction with environment and cooperation with other but also the utilization of study resources. The basic teaching design principles of the constructivism learning theory will be demonstrated as follow:

(1) To emphasize to regard the learner as the center. Students should be the cognitive subject and the active builder of knowledge while teachers are just the roles that provide the chance and motivation of the construction of knowledge for students, furthermore they even don’t have to impart and infuse knowledge to students directly.

(2) To emphasize "cooperative study". It believes that the interaction between the learner and the surrounding environment may play an important role on the understanding of what learners have already studied (the construction of knowledge). The thought and wisdom of the group of learners (including teachers and each learner) could be shared by the whole group through the cooperative learning environment, which means not the only one but the whole group will achieve the construction of the knowledge they have learned collectively.

(3) To emphasize the design of learning environment (not the teaching environment). Constructivism thinks learning environment is the place where learners can feel free to explore and study. In this place, students can achieve their goals by means of various tools, information resources as video materials, multimedia assisted teaching coursewares and the Internet.

(4) To emphasize to support "learning" by information resources (not to support "teaching"). Various kinds of information resources (including multimedia and teaching materials) should be provided for learners during the learning process in order to support both students’ self-learning and cooperative discussions and active exploration of knowledge and achievements of construction.

(5) To emphasize the terminal goal of learning is to complete the construction of meanings. In the environment of Constructivism learning, students should be emphasized as the cognitive subject and the active constructors of meanings, so the terminal goal of the learning is the students’ construction of knowledge.

The paper herein will reset the specific teaching goal and program and ensure the teaching patterns and contents according to the teaching pattern of multimedia assisted.

3. English Teaching Design Assisted by Multimedia Based on Constructivism

3.1. Teaching Goal
The teaching goal should be made up of two parts: listening and speaking of English news in class practice. The students’ after-class listening will be mainly the live news of British and American mainstream TV networks as ABC, CBS, CNN, BBC and domestic news as CCTV-9, Hong Kong news as ATV and Pearl, which will lead students to an interesting world by the simulation of the real situations and let them enjoy the native English. They may improve their self-learning ability by finishing the quantitative listening exercises. The self-learning of English news may also serve the graded teaching of college English of our university effectively. We can get these resources mentioned above through televisions and Internet. From the cultural backgrounds and language difficulty, we can see that the news from CCTV-9 is the easiest while the news from ATV and Pearl is comparatively difficult. Furthermore, news from English speaking countries will be the most difficult and we can choose the news targetedly to meet the needs of students who have higher or the highest demands.

The video materials of news will be the main learning resources of visual-audio-oral part of news English and students can master some listening skills in class where teachers will combine listening with speaking and
then basically understand the English news and broadcasting and TV programs home and abroad. Moreover, students will also be helped to have English conversations fluently, master some conversation strategies and correctly express their personal perspectives, feelings and advice through varieties of speaking activities. Students' abilities of cooperative learning, independent thinking and critical thinking could be improved on the basis of the enhancement of language communication.

3.2. The CAI After-class Self-listening System

The CAI after-class self-listening system will provide chances of learning news English for students, so students can spare their after-class time to go to the school multimedia electric classroom for quantitative news listening exercises. Students could also learn English in dormitory and other places, which may actually realize the goal of after-class self-learning. Teachers will represent the listening materials of the latest current news related to the texts to students by using both text and graphics every week in order to strengthen the students' confidence and interest of learning news English. The CAI system will also innovate on aspect of teacher management. It owns the function of question bank which can compatible with various courses. The system can also meet the need of a medium-sized test. The following Figure 3-1 will represent the structure chart of the CAI after-class self-listening system.

![Figure 3-1. Structure Chart of the CAI After-class Self-listening System](image)

The system will be divided into front-end of student learning and the back-end of administrator management. Students can register the system with their student IDs. The system will provide regular listening exercises and keys each week. After students finish the exercises of each piece of news, they can go to the key interface to check their answers and get the scores. If they can't understand the news well, students can also go to the text interface. Besides for the learning goal, students can also click the English entertainment audio-visual materials interface to watch English movies and listen to English songs after learning, which can relax the students and enlarge their scope of knowledge when they are tired of doing exercises. The management back end includes curriculum design (the editing of papers and questionnaires and the copy of courses), the setting of question bank (test paper recording, test question management and the copy of test questions) and the setting of administrator (including teacher supervising students, helping students to register and checking students' scores and the information interaction between teacher and student).

3.3. Classroom Teaching CAI System

The following Figure 3-2 will demonstrate the back end structure chart of teacher and administrator of classroom teaching CAI system which can assist students to do the after-class listening with the traditional multimedia assisted English teaching classroom courses. It may take full use of the 2 periods of Classroom teaching courses, which can make up for the deficiencies of the lost of intimacy between teachers and students, the weakening role of teacher and language output and chances of communication of students During the process of learning. In classroom teaching, teachers can teach the strategies of English listening understanding alternatively on the basis of principles of equitable distribution of input and output and combination of listening and speaking during the process of news listening, which makes teachers play the role of both "teacher and problem solver" as it in the traditional teaching. Teachers may be not only the participant but also organizer and coordinator when they are conducting the speaking activities related to the themes of each unit such as group discussion, role play and classroom debate.
3.4. Advantages of Multimedia Assisted English Teaching Based on Constructivism

The advantages of multimedia assisted English teaching based on Constructivism will be displayed as following:

1. Learner-oriented

   The traditional teaching of listening will be still on the stage of “listening-checking answers-explanations-relistening” in which students will be on the passive state. Teachers will take charge of what, when and how to listen to. Moreover, due to the current situation of listening course being compressed into 2 periods each week, teachers could do nothing but take the “one size fits all” approach, which makes students have less interest in listening course. However, the self-listening systems based on network multimedia will fix these problems in a large extent. The time of classroom teaching will be student-oriented, so teachers will fully arouse the enthusiasm of learning by choosing the topics related to students' study and life. They may also conduct personalized education, focus more on cultivating the self-learning ability of students and make them master effective learning methods and strategies at the same time when they are studying a language by aiming at students' personal ability and interest.

2. Study with Coordination and Interactivity

   Constructivism believes that the truly effective learning should generate in the interaction between learner's cognitive structure and the outside environment. And this kind of interaction may include the cooperation between teacher and student, student and student, student and the learning content and environment. The course based on the network multimedia will provide a great interaction platform for teachers and students, which may make students keep in touch with teachers in the systems discussion area of the audio-visual system and feedback their advice and suggestion on the course. Furthermore teachers can also send SMS to supervise students or give evaluation. Students can train their communication skills and ability to organize and cooperate on classroom stage by speaking activities like group discussion, tasks and expression.

3. The Real Study Environment

   Constructivism may call for the real study environment. The course will choose living news of mainstream television networks of Britain and America as the audio materials and focus more on bring learners to an interesting English world in the simulation of the real scene, which will make them experience the native English. The course may let students have the immersive feeling by means of combining language, Image and voice together. Students can have plenty of simulations of communication and train their communicative competence and language thinking ability under the guidance of teacher.

4. Abundant Learning Materials

   Network English audio-visual course will bring abundant learning materials to students such as CAI courseware and school network courses. Students can use these materials such as supporting course reading and listening audio-visual materials provided on the school network course online or offline.

4. Teaching Evaluation of Multimedia assisted Teaching System Based on Constructivism

In order to evaluate the multimedia assisted teaching system based on Constructivism used by the paper herein well by practice, we will do experiment and survey targeting at 185 students from one university. We may evaluate the results through the survey. There are 180 copies of survey which is targeting at the two parts of the course, the classroom teaching and after-class self-listening. The following Table 4-1 and 4-2 will show the evaluation results of students on the classroom teaching and after-class self-listening.
Table 4-1. Evaluation Form of Student Survey on English Audio-visual Classroom Teaching

<table>
<thead>
<tr>
<th>The subject of investigations</th>
<th>Very Helpful %</th>
<th>A little Helpful %</th>
<th>No Helpful %</th>
<th>Yes or No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you think course hearing practice improved hearing?</td>
<td>70.08</td>
<td>15.24</td>
<td>14.68</td>
<td>/</td>
</tr>
<tr>
<td>Do you think course oral practice improved oral?</td>
<td>70.43</td>
<td>16.48</td>
<td>13.09</td>
<td>/</td>
</tr>
<tr>
<td>What you think the course of aspect has helpful for your English learning?</td>
<td>(Multi-choices)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Providing the chance for practicing oral, and improved oral presentation skill</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>67.48</td>
</tr>
<tr>
<td>Providing the chance for practicing hearing, and improved hearing comprehensive ability</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>67.89</td>
</tr>
<tr>
<td>Expanding the vocabulary</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>52.48</td>
</tr>
<tr>
<td>More and deeper understanding western society and culture</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>53.49</td>
</tr>
</tbody>
</table>

Table 4-2. Evaluation Form of Student Survey on After-class Self-listening System

<table>
<thead>
<tr>
<th>The subject of investigations</th>
<th>Very Helpful %</th>
<th>Helpful %</th>
<th>A little Helpful %</th>
<th>No Helpful %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you think CAI practice can improve English listening comprehension</td>
<td>18.69</td>
<td>70.45</td>
<td>8.67</td>
<td>2.19</td>
</tr>
<tr>
<td>How do you think the CAI audio material's quality and suitable?</td>
<td>8.73</td>
<td>54.72</td>
<td>35.48</td>
<td>1.07</td>
</tr>
<tr>
<td>How do you think the quality of News exercises?</td>
<td>3.76</td>
<td>65.97</td>
<td>21.78</td>
<td>8.49</td>
</tr>
</tbody>
</table>

From the statistics on the forms above, we can see that the course will be more helpful to students’ listening and speaking, which will mainly be embodied on providing chances to practice spoken English and improve expression; providing chances to practice listening and improve listening understanding; enlarging vocabularies and knowing more about the western culture and society. From the results of the survey, we can also get that the self-listening system (CAI) is highly regarded by students. Moreover, there are 89.45% of students think the exercises of CAI are helpful to the improvement of their English listening while there are only 2.22% of students think the system might be helpless. There are 63.33% of students think CAI listening materials embrace high quality while there are 35.56% of students think these are mediocre. In the subjective item of the survey “Which aspects do you think the system should improve?”, students show that the small capacity and instability of the network system will have impact on the quality of video news. From the aspect of material selection, students suggest to choose materials more related to students’ study and life. And we need a stable and long-term group of teachers to devote themselves for the enhancement of the quality of exercises.

5. Conclusion

Nowadays with the rapid development of computer technology, the combination of English learning and multimedia will be more mature. English teaching will gradually get rid of its old pattern since more and more multimedia information and methods will get involved in English teaching and bring diversity to English teaching. In fact, whether the teaching and learning of multimedia English teaching is successful will depend not only on the development of multimedia software but also the utilization of multimedia teaching software and curriculum design. With the growth of network and multimedia technology and the maturity of computer hardware, there will be necessary to build the theoretical basis of English teaching assisted by multimedia. The current Constructivism theory shares the close connection with the practice of multimedia assisted English teaching according to the related survey. The paper later illustrates the advantages and features of multimedia assisted English teaching based on the theory mentioned in the paper and the design of multimedia English teaching system based on the Constructivism theory. At last, the results of evaluation of students from universities show the pattern of the multimedia assisted English teaching based on the Constructivism theory will be more helpful to the improvement of students' self-learning ability and the teaching quality as well, which reveals the research boasts great practical meaning.

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