A Research on the Construction of Computer Aided College English Teaching System Based on Ecological Teaching

Shasha Zhang

Foreign Language College of Anyang University, Anyang 455000, China

Abstract

The enthusiasm, initiative and creativeness of college students to learn knowledge of the English language is an important foundation and prerequisite for stimulating the English learning environment, and the computer aided college English courses can enrich the teaching content and resources, from diverse teaching modes, break time and space limits to expand learning materials so as to create a favorable language learning environment for students. However, when the computer technology is integrated into college English teaching, there may be some problems in fitness - if students do not have the fundamental computer application technology, such teaching modes cannot give full play to the advantages of computer aided teaching. To this end, in this paper, based on the concept of ecological teaching, the author remeasures the adaptation range and teaching effect of various teaching units such as MOOC, microlecture, multimedia and network platform, analyzes the parameters of computer technology in the theoretical model of ecological teaching system, designs the ecological framework of the function of computer-aided technology in college English teaching and the theoretical evaluation model of ecological teaching effect. It aims to promote the functions of computer aided technology for college English teaching, create a favorable learning environment for students with the concept of ecological teaching, and cultivate their ability of intercultural communication and specialized English.

Keywords: Ecological teaching, Computer, College English, System construction.

I. RESEARCH BACKGROUND

1.1 Literature review

In 2012, Ms. Liu Guiqin, Deputy Director of Department of Higher Education, the Ministry of Education of the People's Republic of China (MOE), summarizes the problems still existing in college English teaching reform in recent years at the senior seminar for outstanding young college English teachers held by the MOE (Wu, 2016). The most prominent problem is that some colleges and universities still stay in the single teaching mode mainly based on lectures given by teachers and the enthusiasm of students is generally low (Ceng and Liu, 2016). Meanwhile, according to most researches, the overall ecological teaching system consisting of computer network technology, multimedia technology and multi-modal context is the emphasis of English teaching that should be vigorously developed at present (Chen, 2017). The importance of English learning lies in intercultural communication. If computer technology is used to serve English teaching, it can build an English learning environment in the language environment, thus guide students to think in English in specific teaching scenarios and understand English culture (Han and Dong, 2011). The ecological teaching system, taking students as teaching subjects, makes full use of the computer teaching environment, forms the advantage assisted teaching, and then fully mobilizes students' subjective consciousness and subjective initiative.

1.2 Research objectives

Ecological teaching refers to the application of the basic principles of ecology of education to think about the relationship between actors in the classroom ecosystem and their dynamic interactions with each other and the environment (Li, 2011). The ecology of education, an interdisciplinary crossing the two fields of education and ecology, is the science to study the correlation and mechanism between education as well as its elements and the surrounding environment (Zhang and Peng, 2013). When introducing ecological connotation into college English education and combining with computer technology, the interaction and internal relation among subject factors, environmental factors and non-physical factors should be fully considered. Thus it can give full play to the support of computer technology in college English classroom instruction, and output key knowledge of
English learning by using MOOC, microlecture, short video, pictures, images, audio and other electronic files, so as to construct a teaching environment based on ecology, in which students are guided to learn and practice. Therefore, it can break through the restraint of traditional teaching and create an effective mode of integrating computer technology for the teaching system. Therefore, this research uses the ecology theory framework to optimize the design of multimedia, network platform, MOOC and microlecture modules, and puts forward the optimization strategy of college English taking the overall teaching system as target of evaluation.

2. THE PARAMETERS OF COMPUTER TECHNOLOGY IN THE THEORETICAL MODEL OF ECOLOGICAL TEACHING SYSTEM

To integrate computer technology into college English teaching, first of all, it is necessary to explore the technical parameters of computer technology under the framework of ecological teaching. These technical parameters are based on computer technology and applied and implemented in college English teaching function modules (Peng, 2013). Its feasibility, fitness and teaching feedback information is a measure for comprehensive evaluation of the integration between computer technology and College English teaching, and also a comprehensive interpretation of the effectiveness of ecological teaching practice. By using the ecological teaching concept to guide the computer technology aided teaching, it can reasonably avoid the deviation in connection between computer technology and teaching environment. If the integration of computer technology with the teaching environment or specific links is poor, the actual teaching effect cannot be guaranteed, which eventually affects the effectiveness of college English teaching. Therefore, in this research, according to the characteristics of college English and computer technology application, the author proposes the construction of 4 kinds of teaching modes, namely MOOC, microlecture, multimedia technology and network platform technology, so as to effectively distinguish and identify the advantages and element functions of computer aided teaching courses and provide theoretical reference for the ecological system of college English teaching. The relevant computer technical variables for reference are shown in Table 1.

<table>
<thead>
<tr>
<th>Variable factor</th>
<th>Teaching unit function module</th>
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<tbody>
<tr>
<td>Subject factor</td>
<td>Network platform</td>
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<td></td>
<td>Computer terminal</td>
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<tr>
<td>environmental factor</td>
<td>Network</td>
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<tr>
<td>Non-physical factor</td>
<td>Language environment</td>
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</table>

2.1 Network platform technology in college English teaching

In recent years, it is the focus of most research to create extracurricular learning environment for students through network platform. From the perspective of teaching results, network platform breaks the limitation of traditional teaching and creates favorable resources for learning from the two dimensions of time and space (Zhang, 2013). In the ecological teaching system, the network platform technology is regarded as the first construction paradigm to expand college English teaching resources, and then the corresponding information and materials can be uploaded to the network-based teaching platforms, including WeChat platform, official microblog and campus LAN, which supports the expanding of college English learning resources.

2.2 Multimedia technology in college English teaching

As for the multimedia technology application in college English teaching, pictures, images, audio, video and other teaching materials can be used to guide students into the teaching scenarios designed by teachers in advance, thereby creating a language learning environment of multicultural communication for students. In the ecological teaching system, multimedia technology is taken as the basic functional units of the teaching materials, and the learning materials and network-based teaching platform relying on each other forms a supplement of teaching in class and after class (Liu, 2012). It is the focus to give instructions on specific contents of the corresponding learning materials and creating a language learning environment of multicultural communication and the extent of acceptance by students is taken as the assessment criteria.

2.3 MOOC technology in college English teaching
MOOC, short for massive open online course, is an emerging online course development mode. It refers to the integration of corresponding teaching resources by colleges/universities and the promoting and design of courses online. Such a teaching mode can vigorously promote the general fitness and generalization of teaching, and students can participate in online learning and ask questions online no matter where they are from (Zhang, 2015). According to the implementation of college English courses, it can choose to supplement teaching contents for students and enlarge students' horizons. The international learning style based on students' major is more helpful for them to have a profound understanding of the way of English communication or the words and expressions in their major. In the design of MOOC functional modules, the general fitness of knowledge structure is mainly considered, i.e. whether the requirements of the major and English vocabulary match college English courses. The instruction mode of MOOC is the main variable for reference in the external language environment and the students' feedback information should be considered in non-physical factors, so as to comprehensively assess the students' understanding.

2.4 Microlecture technology in college English teaching

Microlecture refers to using information technology, in accordance with the cognitive law of English learning, to design English materials for fragmented learning, processes and corresponding augmented materials as structured digital information resources, so as to support the optimized design of English teaching (Zou and Chen, 2016). The core component of microlecture is classroom teaching video. It also includes auxiliary teaching resources related to the teaching topic, such as teaching design, materials, courseware, reflection after teaching, exercises and tests, students' feedback, teachers' comments and so on, which jointly create a microenvironment of semi-structured and themed resource unit application with a certain organizational relationship and presentation. Therefore, college English microlecture is not only different from the traditional type of single-source teaching resources including teaching cases, teaching courseware, teaching design and reflection after teaching, but also a new type of teaching resource that inherits and develops on their basis. The research is also on designing the instruction mode of MOOC as a supporting function module for the ecological teaching system, guiding students to make an independent study arrangement through MOOC, taking students' preview and review as the main teaching function, so as to measure the general fitness of MOOC technology in college English teaching.

3. THE ECOLOGICAL FRAMEWORK OF AUXILIARY FUNCTIONS OF COMPUTER TECHNOLOGY IN COLLEGE ENGLISH TEACHING

The ecological framework of auxiliary functions of computer technology is an English teaching paradigm for providing application and understanding to students by using teaching function units such as MOOC, microlecture, network platform and multimedia. In the ecological framework, whether students can effectively use computer aided technology to learn knowledge of the English language is closely related to teachers' understanding of the framework (Huang, 2016). Any deviation in the design process may lead to the decrease of the applicability of the teaching function modules, and the learning resources obtained by students would be useless or under-utilized. The ecological framework of auxiliary functions of computer technology is shown in Figure 1.

![Figure 1](Ecological Framework Structure of Computer Technology-Assisted Function)
4. THE ECOLOGICAL TEACHING SYSTEM MODEL OF COLLEGE ENGLISH TEACHING AND COMPUTER TECHNOLOGY

4.1 Ecological scale-driven learning model

In the process of the integration of college English teaching and computer technology, the focus lies in effective control of students' reading needs. Therefore, the author builds a model of scale-driven learning. We suppose there are N students in this academic year group, the reference variable of computer technology is K, M means that it can achieve the expected teaching goal through the corresponding computer aided technology, and the steady and big improvement of i students in the language environment created by computer aided technology is represented in vectors Xi and Yi respectively, the model matrix of which is:

\[ X_i = (x_{1i}, x_{2i}, ..., x_{ki})^T \]

\[ Y_i = (x_{1i}, x_{2i}, ..., x_{ki})^T \]

\[ i=1,2,..., N \quad (1) \]

The vector X represents the N mapping information of K in the X interval, so does the vector Y, and the expected learning goal is the learning resource demand acquired by students in the computer technology auxiliary function module. The weight vector of students’ learning needs is obtained from that proportion and Ki is used to represent a student's academic performance in the model of scale-driven learning, then the corresponding teaching quality can be assessed (Guo, 2016). It includes the input of computer aided technology in the teaching effectiveness, namely learning function units of MOOC, microlecture, multimedia technology and network platform technology, and excludes students' learning progress.

4.2 Mode for verification of English resource demand learning dynamic

The optimal weight of students in their learning plan can be used to plan the corresponding maximum expected scope:

\[ \max(u^T y_s^{\alpha} x_i) \]

\[ S/T = u^T y_s^{\alpha} x_i \leq 1 \]

\[ u, v \geq 0 \quad (2) \]

In the above formula, the weighted average maximum of the available learning input in computer technology for i students is the optimal state of the nonlinear rule. The constraint condition is 1, which can avoid the situation of integration not in place in the case of maximum. The degree of ecological teaching can be verified by the following formula:

\[ \min(s/t) = y_i + Y_a = \phi x_i - X_a \geq 0 \]

\[ a \geq 0 \]

\[ i=1,2,...,N \quad (3) \]

On the basis of duality principle of linear programming, the feasibility of the ecological development of English teaching can be verified from the least disadvantage. In the formula, a represents the corresponding variable of students’ needs for using computer technology in English learning, and the integration efficiency can be verified in the No. i decision-making unit of ecological integration. So there must be an interval of 0≤a≤1, and at the point a=1, it indicates a high integration of ecological teaching results; on the contrary, a=0 indicates that students have not fully understood the language learning materials provided by using computer technology. When the student i continues to keep the corresponding effectiveness of computer technology application, namely the corresponding level of language learning ability or the corresponding score in English test, the
proportion of learning input has not changed, so the computer aided English teaching has not achieved high effectiveness for that student during the period, and it indicates a poor integration and the role of ecological teaching system has not been fully played. On the contrary, the integration of ecological teaching can be effectively verified.

4.3 The analytical method of the integration of ecological teaching system

In the actual teaching process, the integration of English teaching and computer technology is a relatively long process of mutual infiltration—students have to master the use of certain software and understand the presentation of English learning materials by using computer technology. There may be a issues of adaptability between time input and learning efficiency, and it is also the full allocation and inclusion of language learning environment and habits. This kind of situation is related to the selection of teaching materials, for example, using multimedia in English teaching is a technology required for colleges, but the scope of examination is detached from the application of multimedia technology, and it is mainly based on MOOC learning resources, so there is definitely certain differences in fitness (Sui and Cheng, 2015). Then, as for the issue of ecological integration, the optimization design should be carried out from the related variables, and the formula that satisfies the minimum demand variable is:

$$\min(s/t) = \left[ -y_i + Y_d \right] / (\varphi x_i - X_d) \geq 0$$

$$N^2 \varphi \geq 0$$

$$i = 1, 2, ..., N$$  \hspace{1cm} (4)

In this formula, N is the standard vector, and the learning efficiency can be represented by Nt, and it can be improved to some extent under the corresponding influence conditions. At this time, the students have not shown weariness but obtain great English applicability and rich English learning materials at the same time. Teachers have more experience in using computer technology, such as video production, graphic editing, voice data collection and integration of English materials corresponding to the students' major, and can provide students with good integration of network learning resources and optimized configuration (Zhang, 2010). In the actual teaching process, English teachers can set corresponding reference variables according to students' feedback, choose computer auxiliary function units according to the teaching conditions of the college, and use the minimum change interval for the reasonable verification of the fitness of the system model.

5. CONCLUSIONS

The ecological framework of auxiliary functions of computer technology is the construction of teaching environment based on a variety of computer technologies, and the effective learning resources that can be obtained by students is an objective evaluation index for the verification of teaching effectiveness. The feasibility and fitness of the corresponding technology can be evaluated by the ecological teaching system model provided in this paper. However, this kind of evaluation model is still at the research stage, and there are few empirical references. Therefore, in the actual process of college English teaching, teachers also need to make adjustment according to students' feedback in a timely manner. Besides, as for the four reference variables designed for computer aided teaching in this research, namely MOOC, microlecture, network-based teaching platform and multimedia technology, there are great differences in application in different colleges and universities. There are situations of hardware technology not in place and flexible index of extent of students' understanding; therefore, in the process of teaching, it can truly play the advantages of various computer technologies in college English teaching only by taking students' participation as the orientation, taking the actual situation of the college into account and combining various computer technologies properly. Moreover, the end point of ecological teaching is to improve the fitness of teaching mode and take the learning environment for students as a comprehensive evaluation index. Therefore, the evaluation of teaching should also give priority to students' learning at different phases, so as to get a comprehensive understanding of the effectiveness of computer technology in supporting college English teaching.

REFERENCES


