Construction Research of MOOC-based O2O Teaching System for College English Cross-cultural Knowledge

Hongxia Wen
Taiyuan University, Taiyuan 030032, China

Abstract

In this paper, MOOC-based O2O Teaching System for college English cross-cultural knowledge is introduced to improve the 3P model of traditional English teaching through data analysis of the combined and optimized fitness function and social evolution operator. First, through analyzing and summarizing a large number of domestic and foreign literatures and research results, the construction scheme of MOOC-based O2O Teaching System for college English cross-cultural knowledge was established. Moreover, this paper studies the construction mode of MOOC-based O2O Teaching System for college English cross-cultural knowledge and finally establishes the teaching system, and concludes that colleges and universities should pay attention to the cultural difference in English learning, and emphasis on the cultivation of college student cross-cultural knowledge. The specific path is online education combined with offline education for common development, thereby enhancing college students' English learning ability and practical ability. To sum up, in college English teaching, we should pay attention to the education of English cross-cultural knowledge, O2O mode for cross-cultural knowledge can be used to combine 3P teaching mode and online education mode in MOOC environment, promoting innovation and development of educational methods under the guidance of the constructivism, so as to improve students’ English proficiency.

Keywords: MOOC Education, College English, Cross-cultural Knowledge, O2O System, Construction Research.

1. BACKGROUND

1.1 Introduction

With the rapid development of information technology and internet platforms, the cycle of knowledge updating is shortened. Educational tools combining Internet and multimedia technologies have become the characteristics of modern education. The popularization of the Internet has not only promoted the progress of society, but also changed the people's learning philosophy and the way of receiving education, creating the conditions and environment for individual learning. Through intelligent algorithms and big data, personal education is achieved, and the general direction is to meet individual needs. At present, learning about cross-cultural knowledge is lack in college English education in our country, which affects college students' understanding and application of English. However, this problem can be solved effectively with MOOC (Cui, 2016). In teaching, schools, teachers and students are redefined. The most important task for traditional university teachers is to teach. However, with the development of online learning, offline teachers will have more time to focus on the development of students' personalities. Communication between teachers and students is more important, including cross-cultural knowledge learning among college students in English learning.

1.2 Purpose

With the development of information technology, MOOC (Massive Open Online Courses) has started to be applied in China's education reform. MOOC Education Platform was first established in 2012 by top universities in the United States to set up an online learning platform to provide free courses. The development of MOOC education has benefited from the support of course providers Coursera, Udacity and EDX, enabling more students to conduct system learning (Deng et al., 2016). At the same time, online classrooms can bring many benefits to learning, every learner can get free resources from prestigious universities and can use any device anywhere to learn, so that learning is no longer subject to time and space limit, this is the value of MOOC (Fang, 2016).

O2O refers to Online to Offline, combining offline business opportunities with the Internet, so that the Internet
becomes the forefront of offline transactions. The concept originated in the United States. The concept of O2O is very broad, as long as the chain can be both online and offline (Li, 2016). The e-commerce model has five elements: independent online store, national authoritative industry trusted website certification, online advertising network marketing, comprehensive social media and customer online interaction, online/offline integrated member marketing system. With the development of information technology, O2O technology has been applied to college English education (Mu, 2017).

2. OVERVIEW OF CURRENT RESEARCH AT HOME AND ABROAD

2.1 Foreign MOOC research and application

The MOOC concept was jointly proposed in 2008 by the Director of Network Communications and Innovation at the University of Prince Edward Island, Canada, and a senior researcher at the National Institute of Humanities and Educational Technology. In response to the call, Dave Cormier and Bryan Alexander presented the MOOC concept in an online course designed and led by the Deputy Director of the Technology Enhancement Institute at the University of Athabaskas and a senior fellow at the National Research Council. The course designed and led by George Siemens and Stephen Downes is called Connected Attention and Connected, with 25 paid students from the University of Manitoba and over 2,300 free students online from around the world participated in this course. All course content is available via RSS feed subscription, and learners can use their own tools to participate: online forum discussions with MOODLE, blog posting, and concurrent online meetings (Zhou, 2017).

Since 2008, a large number of educators, including Professor Jim Groom from the University of Maryland and Professor Michael Branson Smith of the York College of The City University of New York (CUNY), have adopted this curriculum structure and successfully hosted their large-scale open online courses in universities around the world. The most important breakthrough took place in autumn 2011, when 160,000 people from around the world enrolled in a free course entitled "Introduction to Artificial Intelligence" by Sebastian Thrun and Peter Norvig at Stanford University. A number of important innovations, including Udacity, Coursera, and edX, have been launched and more than a dozen of the world's largest universities are participating. Figure 1 shows MOOC mobile education platform.

![Figure 1. MOOC Mobile Education Platform Content](image)

2.2 Research of domestic online education system

Since the 1970s, the domestic online education has entered the research period. Many teaching experiments aimed at autonomous learning have been performed. As early as 2005, Gao Yu published an article entitled "Developing an Online Education System on Campus Network" and elaborated on the necessity of establishing an online education system using the campus network as a medium. In the research on the application of online education system, in 2011, Tu Wenjing and others discussed the ASP technology platform in "Design and Research of Self-study Examination Management Information System Based on ASP.NET" (Wang, 2017). In the same year, Wang Yu et al. conducted a study on the construction of an online education database and published the paper "Integrated English Website Construction and Teaching Application of English Learners Corpus and Online Education System". This paper studied and discussed the construction of learner corpus and the construction of online English education system website. At present, there are many platforms and systems for independent online education in our country. However, most online education and learning are not achieved, and most of which are still at the conceptual level (Hu, 2017). Domestic research on online education and learning system is still focused on the needs analysis and system construction. There was less reasonable database. Now the development of
online education in foreign countries is rapid and system, and has formed a complete and coherent education system.

3. CONSTRUCTION OF MOOC-BASED O2O TEACHING SYSTEM FOR COLLEGE ENGLISH CROSS - CULTURAL KNOWLEDGE

3.1 Basis

Combined and optimized fitness function and social evolution operator

The webservice (WS) refers to the service provided by the offline provider with the QoS index. The web service SW represents a 4-tuple with SW = (ID, qos, Function, Partner), where ID is a unique identifier of a web service used to differentiate web services. The MOOC-based O2O Teaching System for college English cross - cultural knowledge is based on combined and optimized fitness function and social evolution operator (Guo, 2017). In the composition service (CS), the composition service \( S_i \) denotes a 3-tuple \( S_i=(S_w,B_p,f) \), where \( S_w \) is the service set contained in the composite service center; \( B_p \) is the business process targeted by the composite service; \( f \) is a mapping relationship, \( f=S_w \to B_p \), denoting the relationship of the service in the composition service and the task \( t_p \) in the processes, \( \{\forall S_w \in S_w, t_p \in B_p, \exists f=S_w \to t_p\}. \)

The fitness function is used in composition service college English cross-cultural knowledge online education platform for evaluation of optimization results. For an online education platform \( S_w=(S_w,B_p,f) \), which defines the calculated QoS tabulation as a list:

\[
E(u) = \sum_{i=1}^{n} \sum_{j=1}^{n} \sum_{i=1}^{n} d_{xy}^i u_{x,i} + u_{y,i-1}
\]

\[
C_{col}^i : \sum_{j=1}^{N} u_{ij} = 1, j = 1,\ldots, N
\]

\[
C_{row}^j : \sum_{i=1}^{N} u_{ij} = 1, j = 1,\ldots, N,
\]

\[
C_b : u_{ij} = 0 \text{or} 1, i, j = 1,\ldots, N
\]

Where the formula is:

\[
B(u_{ij}) = u_{ij} \ln u_{ij} + (i-u_{ij}) \ln (i-u_{ij})
\]

Using Lagrange method and obstacle function, the problem is unconstrained optimization as follows:

\[
\min F(v) = E(V) + \sum_{j=1}^{N} \theta \left[ \sum_{i=1}^{N} u_{ij} - 1 \right] + \sum_{i=1}^{N} \lambda \sum_{j=1}^{N} B(u_{ij})
\]

The data combination needs to meet the QoS constraints of cross-cultural knowledge of college English, and needs to improve research efficiency by reducing the cost of communication between data portfolio research platform service providers. This paper adds QoS-aware filtering stage before the traditional optimization stage, so as to select a candidate set from massive data, avoid large-scale data input in the optimization stage, and speed up the convergence of the algorithm. QoS-aware filtering stage is added in the research and design of college English cross-cultural knowledge education platform. The filtered data is a candidate set for the optimization phase, high-quality data is preserved when inappropriate information is filtered out (Yang, 2017). In this study, the filtering phase is divided into two stages, the first stage is the Skyline service; the second stage is the stage of social knowledge expansion, which extends the candidate set through the composition service set to ensure that most data finally join the construction of college English cross-cultural knowledge education platform. This method is
called Skyline filtering method of social information expansion. The SESF method can enforce the execution efficiency of algorithms, retain excellent data and overcome the problem of high Skyline filtering capacity, so as to optimize the follow-up data and avoid local convergence, which helps the construction of MOOC-based O2O Teaching System for college English cross-cultural knowledge.

### 3.2 Construction process

#### 3.2.1 Construction of O2O online education platform

Via analysis of combined and optimized fitness function and social evolution operator, the MOOC-based O2O Teaching System for college English cross-cultural knowledge should be composed of message notification, professional courses, cross-cultural knowledge courses, personal preferences, personal learning objectives and basic course etc. The class is carried out by teachers and students in the classroom using the modules. The students focus on the key difficult or cross-cultural knowledge topics for online interactive communication. Teachers can understand students in real time (Xiong, 2017). The platform also comprises a personal center module for managing personal information, comprising of a teacher personal center and a student personal center for setting and viewing personal information. The platform provides students with O2O (Online + Offline) learning resources. The professional courses, cross-cultural knowledge courses and personal preferences modules adopt Online + Offline learning mode. High-quality learning resources are jointly provided by teachers and students online, including professional video, audio, documents, pictures, etc. Teachers and students apply for guidance or answer questions offline. Professional teachers can learn cross-cultural guidance, or apply for Chinese International Teacher Certification, PubMed, civil servants and other guidance. Some students with strong cross-cultural knowledge or ability can also apply for offline classes. Figure 2 shows the online mobile O2O education platform model.

![Figure 2. Online Mobile O2O Education Platform Model](image)

#### 3.2.2 Construct O2O simultaneous translation system

Simultaneous translation system is based on China online simultaneous translation system. This system translates the speaker's report content through simultaneous translation and transmits it to listeners who receive different languages. The main index: working frequency: 75.4-76.0MH; transmit power ≤ 10mW; frequency tolerance ≤ 100 × 10^{-6}; occupied bandwidth ≤ 200KHz; spurious emission power attenuation ≥ 30d. Working principle: the system conducts one-way synchronized language information transmission under the principle of signal frequency modulation, with different languages sent by different frequency transmitters, together with a number of receivers (as required). Each receiver is set with 2-6 receiving frequency. Each frequency is set for one language, controlled by a frequency-selective switch. The listeners can choose the language they want (Yu, 2017). Features: the
translator will select the number on the machine for simultaneous transmission. Each number corresponds to one language. The system is configured flexible, and designed portable. No special modification on site, and temporary layout can be set; The transmitter is handled via special technology. The frequency work point is stable and reliable, anti-interference. The receiver is sensitive and stable, convenient for selecting language and practical. The O2O simultaneous translation system is integrated with the MOOC-based O2O Teaching System for college English cross-cultural knowledge to avoid language barriers on undergraduates’ cross-cultural communication and learning (Sun, 2017).

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Sound Track Details of the Simultaneous Translation System</th>
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<tbody>
<tr>
<td>Sound channel</td>
<td>Sound channel</td>
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<tr>
<td>4</td>
<td>8</td>
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<td>primary</td>
<td>intermediate</td>
</tr>
</tbody>
</table>

3.3 Analysis of experimental results

From the perspective of the research process, the MOOC-based O2O Teaching System for college English cross-cultural knowledge has many constraints. First, the planning and developing the network teaching system cannot be completed by one teacher. Interdisciplinary or even inter-faculty teachers shall work together for implementation. Second, to construct such an online teaching system, the teachers must master the use and operation of various software to improve their ability and level of computer application, actively supporting the construction of network course system and to maximize the sharing of teaching resources (Lei and Chen, 2017). Third, higher quality MOOC courses should consist of multiple modules and contents, which need planning and organization. During teaching, both resources and technology should be guaranteed. Teachers should also sum up problems during using of the system to enhance MOOC teaching efficiency, so as to consolidate the understanding of cross-cultural knowledge of English by college students. Finally, the O2O Teaching System for college English cross-cultural knowledge shall be used combining O2O simultaneous translation system, to deal with language barriers in learning cross-cultural knowledge.

4. BRIEF CONCLUSION

The popularization of the Internet has not only promoted the progress of society, but also changed the people's learning philosophy and the way of receiving education, creating the conditions and environment for individual learning. To improve the teaching of college English cross-cultural knowledge and better understanding the national culture of target language, this paper constructs a MOOC-based O2O Teaching System for college English cross-cultural knowledge to improve traditional English teaching in 3P mode. First, through analyzing and summarizing a large number of domestic and foreign literatures and research results, the construction scheme of MOOC-based O2O Teaching System for college English cross-cultural knowledge was established (Xu, 2014). Moreover, this paper studies the construction mode of MOOC-based O2O Teaching System for college English cross-cultural knowledge and finally establishes the teaching system, and concludes that colleges and universities should pay attention to the cultural difference in English learning, and emphasis on the cultivation of college student cross-cultural knowledge. The specific path is online education combined with offline education for common development, thereby enhancing college students' English learning ability and practical ability. To sum up, in college English teaching, we should pay attention to the education of English cross-cultural knowledge, O2O mode for cross-cultural knowledge can be used to combine 3P teaching mode and online education mode in MOOC environment, promoting innovation and development of educational methods under the guidance of the constructivism, so as to improve students’ English proficiency.

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