



# Acquiring the Cultural Characteristics of English Online Courses Based on Wavelet Transformation

Ying Lin<sup>1,2(✉)</sup>, Megawati Soekarno<sup>1</sup>, and Yangbo Wu<sup>3,4</sup>

<sup>1</sup> Faculty of Psychology and Education, University Malaysia Sabah, 88000 Sabah, Malaysia  
Linying0813@126.com

<sup>2</sup> School of Foreign Languages, Xinyu University, Xinyu 338000, China

<sup>3</sup> Faculty of Computing and Informatics, University Malaysia Sabah, 88000 Sabah, Malaysia

<sup>4</sup> School of Mathematics and Computer, Xinyu University, Xinyu 338000, China

**Abstract.** In recent years, China's online English curriculum has received extensive attention, not only because it is more in line with the educational development background of the new era, but also because this teaching mode has stronger flexibility, coupled with the assistance of information technology, which further improves the extraction effect of English curriculum cultural character. Therefore, the research on the extraction method of English online curriculum cultural character based on wavelet transform. Set the theoretical objectives and construction principles of cultural character of English online course, build a multi-level feature extraction model under wavelet transform, and extract the cultural character of the course by wavelet phase transform extraction method. The final test analysis shows that under the same test environment, compared with the traditional Gabor correlation extraction test group, the extraction test group of wavelet transform finally obtains the higher accuracy of cultural character extraction of English online course, which shows that it has better effect on cultural character extraction of English online course and has practical application significance.

**Keywords:** Wavelet transformation · English online course · Cultural characteristics · Characteristics acquiring · Acquiring method · Transformation structure

## 1 Introduction

English curriculum has always been in a key position in China's educational structure. The objectives and values of education are mainly reflected and implemented through different types of curriculum. Therefore, the renewal and reform of curriculum is the core content of educational innovation and development. At present, the English curriculum reform all over the world is in full swing. Profound changes have taken place in curriculum concept, curriculum objectives, curriculum content, curriculum implementation and curriculum evaluation. The curriculum research paradigm is gradually breaking through

the constraints of the traditional research framework and starting to make an in-depth exploration of curriculum theory from a broader perspective [1].

In addition, with the advent of the era of globalization, international economic cooperation and trade exchanges are becoming closer and more frequent, and a multicultural global village is taking shape [2]. In this case, relevant foreign scholars began to pay more attention to and examine the significance and value of English education. Foreign researchers attach importance to the research results of the character of English online culture courses through the method of observation and research, and believe that the purpose of English education is no longer limited to being able to speak a few foreign languages and translate, but to enable students to better survive and develop in a multicultural global village [3]. Looking back at the development of English Curriculum in China, we can find that in the past few decades, although the pace of reform has never stopped, there are few real major breakthroughs. The main methods used are genetic algorithm, neural network and other methods, resulting in the overall effect is not very ideal. The narrow horizon of English curriculum research is the main reason [4]. The narrow research horizon will inevitably not provide a broader development space for the development of English curriculum. Therefore, breaking the limitations of traditional research fields, starting with linguistics, culturology, sociology, anthropology and other disciplines, and adopting interdisciplinary research paradigm to carry out in-depth research on English curriculum is bound to become the development trend of English curriculum research in China. Nowadays, with the continuous development of China's information technology and network technology, it also expands the space and scope for the further development of China's English teaching, and further adjusts the overall English teaching mode by using relevant innovative computing methods. For example, English online teaching, multimedia network practice, flipped classroom, etc. while innovating the teaching mode, it also needs to be based on the promotion of cultural character, this paper focuses on a comprehensive and profound analysis of the cultural nature and cultural function of English online courses. In view of the inseparable relationship between language and culture, curriculum and culture, it is considered that English online curriculum itself has significant cultural character. Based on the interpretation of the connotation of cultural character of English online courses and the in-depth investigation of its current situation, this paper reveals the phenomenon of "loss of cultural character" in the research and development of English courses in China, and puts forward the trinity of "language culture curriculum" English curriculum theory construction framework. From the dimensions of curriculum theory research and English curriculum construction, This paper probes into the cultural reconstruction of English Curriculum in China.

Wavelet transform is a new transform analysis method. It inherits and develops the idea of localization of short-time Fourier transform. At the same time, it overcomes the shortcomings that the window size does not change with frequency. It can provide a "time-frequency" window that changes with frequency. It is an ideal tool for signal time-frequency analysis and processing. The main feature is that it can fully highlight the characteristics of some aspects of the problem through transformation, analyze the localization of time and space frequency, and gradually refine the signal through expansion and translation operation, so as to finally achieve the time subdivision result at high

frequency. In recent years, it has been widely used in the cultural character extraction method of English online courses, and achieved relatively good results [5]. Therefore, the cultural character extraction method of English online course based on wavelet transform is analyzed and studied. This paper discusses from different directions, constructs a multi-level feature extraction model under the wavelet transform, realizes the extraction of cultural character in the course by the wavelet phase transform extraction method, explains the close relationship between English course and cultural character extraction, and enhances the actual teaching quality level of English online course.

## **2 Acquiring the Cultural Characteristics of English Online Courses Based on Wavelet Transformation**

### **2.1 The Theoretical Goal Setting of Cultural Characteristics in English Online Courses**

The formation of the cultural character of English online courses has a solid theoretical foundation. It is mainly manifested in the following aspects: as a language course, English online courses are deeply influenced by linguistics; as a subject, English courses are influenced by course related theories; English online courses as a language teaching activity are deeply affected by social and cultural theories. The following is mainly based on linguistics, curriculum theory and social cultural theory, to explain the theoretical basis of the cultural character of the English curriculum [6]. Therefore, it is necessary to set the basic goal of extracting cultural characteristics in English online courses. In fact, language is the unique spiritual wealth of mankind. It is inseparable from life. In the whole process of human life, all the material and spiritual civilization of mankind are naturally connected with language. Any healthy and normal person has the ability to use language, and all human activities are inseparable from language. Language is a social product, which develops with the development of society, changes with social changes, differentiates with the division of society, and unifies with the unity of society. It is also the most important social phenomenon of mankind, and sociality is one of the essential characteristics of language. This attribute of language is closely related to human sociality. It can be said that people and society have created language. Therefore, the target setting range for the acquiring of cultural characteristics in English courses should be set to a wider range, and the actual cultural characteristics acquiring attributes should be established.

The establishment of the cultural characteristics acquiring attribute of English online courses makes it obtain a real cultural role. However, curriculum can not be directly equated with culture, because curriculum, as a part of culture, can not represent the whole culture. Obviously, through the analysis of the culture in the English online course, we can know that what can really become the course is only a small part of the culture. In real society, due to the lack of reasonable analysis of the cultural characteristics of English online courses, a considerable part of culture can not be included in the courses. Only according to the rationality of educational theory, can we really start from the rational construction of standardized curriculum in education and teaching, take English online curriculum as a cultural existence, restore the cultural characteristics of English

online curriculum itself, and establish the cultural noumenon nature of English online curriculum.

At the same time, it should be noted that a certain degree of autonomy is essential in the setting of cultural characteristics acquiring goals. From a cultural perspective, the tool-oriented English online course is a course that lacks vitality, and it is a course that has lost the foundation of survival [7]. Therefore, its goal can only be to cultivate people who become tools through indoctrination and training. The autonomy of the cultural character of the English online course shows that the English course is an independent cultural pattern. It is neither a copied “other culture”, nor a vassal or puppet of other cultures, nor a passive cultural expression, but a self-conscious and self-contained cultural state. Looking back on the history of the development of English online courses, it is not difficult to find that there has never been an independent English course with independent cultural style [8]. The instrumental role of English online courses makes its own cultural qualities inherently obscured. On the surface, English online courses also seem to have the performance of processing and selecting culture, but this selection and processing is only formal, not the slightest. Therefore, cultural subjectivity is crucial to the reconstruction of English online courses [9].

The value of cultural characteristics autonomy of English online course is mainly reflected in its consideration of human subjectivity. Human subjectivity is not formed naturally, nor is it the result of self evolution, but needs education to play an important role [10]. In the era of carrying forward people’s subjectivity and emphasizing people’s dominant position, it has become a very important proposition to endow the English curriculum to cultivate students’ individual subjects with the cultural quality of autonomy. It is one of the aims of contemporary education to cultivate learners’ initiative and subjectivity and make learners truly independent individuals. The relationship is shown in Fig. 1 below:

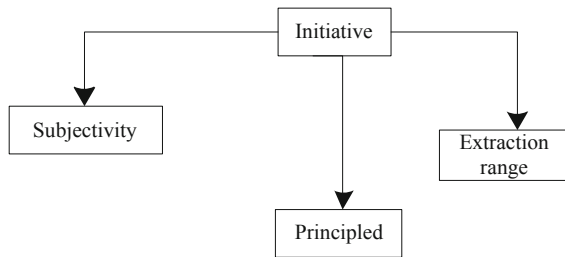


Fig. 1. Value relationship of character autonomy

Figure 1 helps to understand the above-mentioned structural relationship. At the same time, it is also the intended meaning of the independent cultural character of English online courses. The autonomy of the cultural character of English online courses is also manifested in its criticism and innovation of the culture it loads. In other words, in the process of reflecting and inheriting the external objective culture of English online courses, it is necessary to adopt a critical and dialectical point of view, instead of adopting an attitude of full acceptance or complete identification. It is necessary to critically reform

these external cultures. This is not only the intended meaning of cultural heritage itself, but also the mission of English online courses. At the same time, we must realize that if we want to use these external cultural materials to criticize, reconstruct and innovate the ideas of English online courses, without the autonomy of the cultural characteristics of the English courses as the foundation, it is difficult to achieve the expected acquiring goals. Therefore, when setting goals, we must ensure that they are diverse and stable.

## 2.2 Setting the Principles of Cultural Character Construction

The scientific and reasonable construction principle is an important guarantee to ensure that the cultural characteristics of the English curriculum can be demonstrated. To truly highlight the cultural attributes of the English curriculum in theory and practice, it must follow the integration, contextualization, equality, development and principles of practicality.

One is the principle of integration. For a long time, in our English online courses, the teaching content is relatively abstract and has no immediate effect on language acquisition. Therefore, the training involves little or no teaching of cultural knowledge, and education about culture is only English courses. The appendages in the Chinese language are independent of online English teaching and are in a dispensable situation. The principle of integration means that within the setting of English online courses, the selection and implementation methods, as well as the evaluation methods and content, etc. are organically integrated in the field of language, and cultural knowledge and language knowledge are integrated into the same. In a process, the current situation of the separation of the two is changed, so that the students' cultural awareness and language knowledge can be developed simultaneously. The fundamental purpose of foreign language online courses is to improve learners' language skills and cultivate learners' cross-cultural communication skills. Therefore, as a foreign language course, it must integrate different cultures and use a variety of comprehensive practical activities to finally achieve it. Unique educating function. Integration, in itself, is an important basic principle in the process of constructing the cultural characteristics of English online courses.

The principle of integration is also reflected in the integration of English teaching content and the acquiring of cultural characteristics as well as integration of cultural knowledge and language knowledge in English teaching. It has been fully demonstrated before that cultural knowledge and language knowledge are the key to truly mastering a language. If there is bias or neglect at any end, only by closely connecting culture and language can we really give full play to the practical function of cultural characteristics acquiring. Integration is also reflected in the integration between English online courses and other disciplines. As an English online course for foreign language learning, it can organically integrate the curriculum content of English and other disciplines according to the specific situation of different students and the reality of students in different grades, break the barrier between English and other disciplines, and establish a diversified cultural characteristics acquiring goal.

The second is the principle of contextualization. The so-called situational principle is a curriculum implementation environment that is close to students' daily life, resonates with students and conforms to students' interests in the construction of English online

curriculum cultural characteristics, that is, in the process of English online teaching and learning, pay attention to the intake of situational content, actively create a life-oriented learning environment and lead out the corresponding cultural characteristics. Guide students to connect what they have learned with the reality of life so that students can deeply understand the cultural connotation of the language they have learned. For English online courses, focusing on situational creation can enable students to constantly adjust and stimulate students' excitement points, attract students' attention and keep students in an excited and active state in changeable teaching activities. In this way, the teaching effect will get twice the result with half the effort.

The third is the principle of equality. Culture is shared by all mankind. To a certain extent, the cultures of different countries in the world share commonality, but there are also significant differences. Differences are caused by different social conditions and other factors, and are by no means caused by the advantages and disadvantages of different cultures. Therefore, when facing the impact of different cultures in various countries in the world, and when comparing and analyzing different cultures The characteristics of the culture should be fully valued and respected, and there should be no discrimination or ridicule of any culture, and prejudice against certain cultures.

English online courses not only have cultural attributes themselves, but are also an important way for students to understand world culture. Therefore, in the process of constructing the cultural characteristics of English courses, the principle of equality must be adhered to. The principle of equality refers to the ability to treat different cultural expressions with an equal attitude when dealing with different cultures in the world, to understand the differences among the cultures of the world, and to maintain an inclusive attitude to these differences. Specific to the cultural characteristics of English online courses, the principle of equality mainly includes the following aspects. The specific structural relationship is shown in Fig. 2 below:

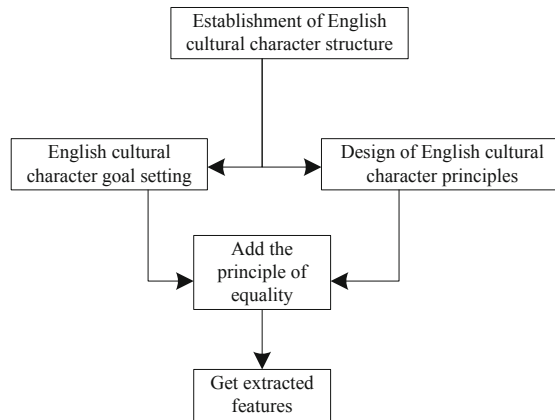


Fig. 2. Structure diagram of equality principle

According to Fig. 2, under the guidance of the principle of equality, we should respect cultural character. In the context of cross-cultural communication, rationality

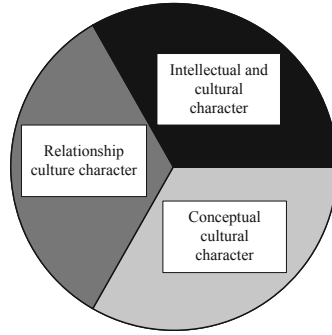
and practicality are equal, and there is no distinction between high and low. Therefore, the subject of cross-cultural communication must treat the communication object and the cultural environment of the communication object with a respectful attitude, which is conducive to the gradual unification of the cultural character of using a foreign language.

The fourth is the principle of development. This development determines the influence scope of the cultural characteristics of English online courses, and English online courses are also developing. In addition, because the cultural character subject of English online course is developing continuously, we must adhere to the concept of development in the cultural character construction of English online course. The principle of development includes two aspects: one is the development of culture itself. For a long time, whether we regard culture as the material product or spiritual product of human society, we are used to understanding the connotation of culture from a static point of view and understanding culture as a noun. Of course, this explanation has its own reasons, but looking at the history of human cultural development, we can find that the cultural character itself is not invariable. At the same time, cultural character and its types also develop and change with the development of society. The second is diversified development. We should build a development system from three aspects: establishing scientific cultural teaching values, building a cultural education system with humanistic characteristics and implementing a reasonable cultural evaluation mechanism, expand English culture teaching and improve the cultural consciousness of English curriculum learning.

Fifth, the principle of practicality. This means that in the process of constructing the cultural characteristics of English online courses, we must participate in the practical activities of English language, gradually improve the expression ability of English language in the continuous process of English expression, and test the effectiveness of English learning in combination with the cultural characteristics of language. If we lack English practice, we will lose the motivation of English learning and development, there will be no improvement in comprehensive language literacy, and various mistakes will be made in the process of language use. Therefore, principle of practicality is the fundamental principle that must be adhered to in the process of constructing the cultural character of English online course. Its implementation are directly related to the implementation of other principles, and it also governs other principles to a certain extent. Only the language ability that can stand the test of practice can be called the real language ability.

### **2.3 Construction of Multi-level Characteristics Acquiring Model Under Wavelet Transformation**

The diversity of cultural characteristics of English online courses is mainly reflected in its artistic character, cultural heritage character, communication character. The specific structure distribution is shown in Fig. 3 below:



**Fig. 3.** Proportion of diversified value of English cultural character

According to the proportion analysis in Fig. 3, we can understand the importance of cultural character applied in teaching. Therefore, on the basis of the above information, the actual value of the proportion needs to be extracted first, as shown in Formula 1 below:

$$K = (2\phi + \frac{a}{3}) - 3\mathfrak{R} \quad (1)$$

In formula 1:  $K$  represents the actual value of the acquiring ratio,  $\phi$  represents the acquiring range,  $a$  represents the variation coefficient, and  $\mathfrak{R}$  represents the acquiring error. Through the above calculation, the actual value of the actual extraction proportion can be obtained. Take it as the corresponding proportion range, set it in the overall structure of extraction, and set the structure on the initial wavelet change basic extraction model. In order to improve the actual effect of extraction, an extraction wavelet transform matrix can be created in the model, and then calculate the relevant extraction transform trend value, as shown in formulas 2, 3 and 4 below:

$$M = \sqrt{3R + 1.25\chi} - \frac{t + 2e}{2} \quad (2)$$

$$B = \sqrt{6R + 1.25\chi} - \frac{t + 4e}{2} \quad (3)$$

$$D = \sqrt{9R + 1.25\chi} - \frac{t + 6e}{2} \quad (4)$$

In formulas 2, 3, and 4:  $M$ ,  $B$ ,  $D$  represent the acquiring transformation trend value,  $R$  represents the wavelet acquiring ratio,  $\chi$  represents the extension transformation coefficient,  $t$  represents the target acquiring range value, and  $e$  represents the allowable limit error value. The above coefficients are set according to the calculation scale parameters. Through the above calculation, the actual extraction trend value can be obtained. Set it in the initial extraction model, summarize and integrate the set corresponding extraction principles, and finally form a more complete multi-level extraction structure.

In the context of quality education, teachers should keep up with the times and learn new educational ideas, such as flipped classrooms and micro-classes in order to improve

students' English cultural character. In addition, use flexible and effective evaluation strategies in the practice of English teaching, pay attention to the growth and progress of students, strive to increase their confidence, stimulate their curiosity, increase their interest in learning English, tap their potential, and truly improve English online teaching quality to achieve the goal of the new curriculum reform. Take the new acquiring target as the core, use the diversity of the model to process the existing acquiring tasks, use the multi-level principle to extract the structure, and add the wavelet transform processing structure to extract the characteristics of the cultural character of the English online course, complete the construction of multi-level feature acquiring model under wavelet transform.

On this basis, in order to further improve students' cultural character by using the model, teachers can also carry out a variety of English class activities, such as quiz game and English story telling competition. When these activities are held, some small prizes can be set to reward active participants and activity winners, so as to attract students' attention and stimulate students' interest in learning. These activities not only attract English loving students to actively participate, but also mobilize the interest of students with learning difficulties in English and give full play to their other strengths. In English teaching, English teachers should consciously introduce some short cultural stories to students, and prompt students to think in some key places and deliberately cultivate students' ideological and moral character, so that students will improve their cultural character unconsciously.

#### 2.4 Wavelet Phase Transformation Acquiring Method to Achieve the Acquiring of Curriculum Cultural Characteristics

Before acquiring, it is necessary to align the saliency and make the corresponding analysis. The extracted feature vector calculated by the direct Gabyssdy wavelet transform method can effectively identify the image, and has rotation and scale invariance, but it has the defect of high dimension. Feature acquiring algorithms usually hope to not only extract features with significant identification, but also make the calculated extracted feature vector have low dimension. According to this idea, a feature acquiring method based on Gabyssdy wavelet transform is proposed in this paper.

Assuming that  $PS = \{0, \dots, P - 1\}$  is used to denote the acquiring set, and  $QS = \{0, \dots, Q - 1\}$  is used to denote the direction set, there are a total of  $P \times Q$  types of acquiring and direction combinations. If  $CS$  is used to denote the combined set, it can be expressed as shown in formula 5:

$$S = (\omega + \frac{E}{2} - 4A) - \frac{1}{V} \quad (5)$$

In formula 5:  $S$  represents the combination set,  $\omega$  represents the verification range,  $E$  represents the set condition of the wavelet transform,  $\aleph$  represents the actual value acquiring, and  $V$  represents the application transformation acquiring range.

Through the above calculation, the actual combination set can be finally obtained. If the first four cultural character features are selected from  $ES$ , and the maximum energy level value is calculated, the cultural character features are extracted from the direction

corresponding to the level value, and the image identification is constructed based on these features, which may only be partially, it can be extracted in layers. For the acquiring of cultural character in English online teaching, it is also necessary to consider the phase of its acquiring, and the wavelet phase transform acquiring method is used to finally realize the acquiring of the cultural character of the course. According to the above analysis and the acquisition of data information, the calculation of the wavelet phase transformation ratio is carried out, as shown in the following formula 6:

$$G = \kappa + \frac{\sqrt{F}}{3} - 1.25\lambda \tag{6}$$

In formula 6,  $G$  represents the wavelet phase transformation ratio,  $\kappa$  represents the wavelet fixed value,  $F$  represents the actual range of the phase, and  $\lambda$  represents the phase processing acquiring coefficient. Through the above calculations, the actual wavelet phase transformation ratio can be finally obtained, which is set in the acquiring model to extract the cultural character of the English online course. From different angles, the wavelet phase transformation acquiring method is used to achieve multiple acquiring of English online course cultural character.

### 3 Method Test

This test is mainly to verify the accuracy of cultural character extraction of English online course under wavelet transform. The test is divided into two groups. One group is the traditional Gabor correlation extraction method, which is set as the traditional Gabor correlation extraction test group; The other group is the wavelet change culture character extraction method designed in this paper, which is set as the extraction test group of wavelet transform. The two methods are carried out at the same time, and the results are compared and analyzed.

#### 3.1 Test Preparation

Select 6 classes of school A as the main goals of this test, set and calculate related indicators, as shown in Table 1 below:

**Table 1.** Experimental parameter table

Test index	Fixed index	Dynamic change index
Fusion ratio	0.5214	0.6741
Average score	89.21	86.31–92.15
Class size	65	65
Highest score	98.62	89–98.62
Minimum score	52.12	50.09–83.52

According to the data information in Table 1 above, the relevant test conditions can be obtained finally. After completion, set the wavelet transform range, as shown in Table 2 below:

**Table 2.** Wavelet transformation parameters

Range index	Standard range	Adjustment range
Extract the associated value	0.5214	0.116
Orientation equalization coefficient	16.37	20.92
Bias function	-0.3941	-0.1574
Dynamic imbalance value	4.4	4.12

According to the data information in Table 2 above, the actual wavelet transform range can be set finally. After completion, check whether the relevant information of the test is correct and in an error free state.

**3.2 Test Process and Result Analysis**

Start the test, arrange the English online courses of six classes evenly in the course structure, test their teaching effect at the beginning of each month, record the relevant results, and set the period as six months. Finally, verify the students’ course completion rate and cultural character, extract the students’ English course cultural character, and match the extraction results of different methods with the actual character results, to propose the verification results of character extraction accuracy. The details are shown in Table 3 below:

**Table 3.** Analysis of experimental results

Number of experiments	Traditional Gabor correlation extraction test group character extraction accuracy	Wavelet transform extraction test group character extraction accuracy
10	90.2	80.3
20	90.5	80.1
30	90.6	80.6
40	90.9	80.4
50	90.4	80.5
60	91.1	80.7

*(continued)*

**Table 3.** (continued)

Number of experiments	Traditional Gabor correlation extraction test group character extraction accuracy	Wavelet transform extraction test group character extraction accuracy
70	90.5	80.2
80	90.3	79.6
90	90.8	80.1
100	90.7	80.2

According to the data information in Table 3, we can finally draw the following conclusions: under the same test environment, compared with the traditional Gabor correlation extraction test group, the wavelet transform extraction test group finally obtains relatively high character extraction accuracy, which shows that it has better effect on the cultural character extraction of English online courses and has practical application value.

## 4 Conclusion

The cultivation of English cultural character needs a long process, which is essentially the cultivation of a good habit. It requires the continuous efforts and support of students and teachers in the process of learning. Therefore, this paper studies the cultural character extraction method of English online course based on wavelet transform, and verifies the performance of the method from both theoretical and experimental aspects. This method has a high extraction accuracy when extracting the cultural character of English online course, which is always maintained at more than 90%. Therefore, it shows that the character extraction method in this study can meet the needs of use. In the future research work, we should further improve the accuracy of cultural character extraction and improve the application value of the method.

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