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Developing English Reading Comprehension Modules Incorporating Chinese Culture for Undergraduates in China

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ABSTRACT

This study aims to develop a set of English Reading Comprehension Modules (ERCMs) to effectively promote Chinese students' reading proficiency and enhance their knowledge of Chinese culture to promote Quality Education. The ERCMs were developed using the ASSURE Model and contain 45 reading passages about Chinese culture for primary, intermediate and advanced readers. The reading materials were validated by experts, and a pilot study with 90 undergraduates was conducted to determine the reliability of the ERCMs. Following the rigorous development of the ERCMs, a further 131 students took the pre-test and participated in the main study, using the modules at their own level of difficulty for five weeks, during which time the process and details of class were observed and documented in Classroom Observation Checklists. Then they participated in the post-test, in which six students and three teachers were interviewed. The results of the study shown varying degrees of improvement in the learners' overall reading ability as well as in literal comprehension, reorganization and inferential comprehension. Analyses of classroom observation checklists and interview transcripts confirmed this finding. In addition, both teachers and students reported that they had learnt more about Chinese culture through the ERCMs. We hope that the ERCMs can be used as supplementary materials to improve students' English reading comprehension and Chinese cultural literacy.

Keywords: ASSURE Model; Chinese Culture; English Reading Comprehension Modules (ERCMs); Quality Education; Reading Performance

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1. Introduction

English stands as the foremost global language, facilitating vital communication across diverse realms such as science, technology, and humanities. It serves as a pivotal medium for China's increasing engagement with the international community[1]. China has also awakened to the educational significance of culture and has paid more attention to the inheritance of its own culture in recent years[2]. Therefore, Chinese colleges and universities have integrated College English as a compulsory course, following the requirement of the Ministry of Education, underscoring the dual instrumental and humanistic significance of these courses[3]. Firstly, with the internationalisation of higher education, using English as the medium of instruction has become the basis[4]. College English courses serve as a conduit for cross-cultural education, enabling students to grasp foreign societies and cultures, foster an understanding of cultural diversity, and hone cross-cultural communication skills through the acquisition of the English language[3]. Secondly, these courses contribute to the expression of Chinese culture on the global stage, emphasizing the need to infuse Chinese cultural content into the curriculum[5].

However, due to the economic and cultural prosperity of the Western world in the early days of reform and opening up, English teaching in China attaches great importance to Western cultural content and still has inertia[6], thus potentially ignoring the rich heritage of Chinese national culture. Hence, it becomes imperative to consciously enhance students' cultural awareness, thus fostering cultural self-confidence and promoting effective intercultural communication skills within the higher education environment[7].

Over the years, teaching materials and resources of Chinese culture has been neglected in English education in Chinese universities[5]. Existing textbooks for college English courses predominantly feature content sourced from English-speaking countries, resulting in a deficiency of Chinese cultural elements[8], thus misaligning with the Ministry of Education's stipulated output requirements. This has resulted in the lack of effective teaching materials incorporating Chinese culture, impeding the attainment of mandated educational standards.

To address these gaps, this study seeks to develop English Reading Comprehension Modules (ERCMs) infused with Chinese cultural content and check the effectiveness of facilitating College English teaching for undergraduates, improving their English reading comprehension ability and enhancing cultural understanding.

Therefore, this study proposes the following hypotheses:

Hypothesis 1. *The use of ERCMs will significantly improve students' English reading comprehension ability.*

Hypothesis 2. *The use of ERCMs will enhance students' understanding of Chinese culture.*

2. Literature Review

2.1. Previous Related Studies on English Reading Modules

Javed et al. developed Reading Comprehension Modules for ESL teachers in Malaysia to effectively improve students' diverse reading skills[9]. They describe how different texts of varying lengths from a variety of authentic sources were adopted and adapted for students with varying reading abilities and discusses how to appropriately construct questions[9]. Their thoughts on adapting texts and constructing reading comprehension questions shed light on the corresponding sections in this study.

Surdyanto and Kurniawan developed an effective and practical critical reading modules for English majors with ADDIE (Analyse, Design, Develop, Implement, Evaluate) model[10]. This module developed was based on CLIL (Content and Language Integrated Learning) learning and emphasized not only language skills but also how the content of the learning promotes thinking and understanding of the learning objectives. Using a scientific model for module development inspired this study.

2.2. Taxonomies

Since the development of the reading comprehension modules requires the reading comprehension text as the reading object and the reading comprehension question as the carrier of comprehension, the study involves how to select the text and the questions. Two taxonomies were mainly used in this study as the criteria for selecting texts and questions.

2.2.1. Revised Bloom's Taxonomy of Educational Objectives

A revised version of Bloom's taxonomy offers a more contemporary framework for curriculum design, teaching,

and learning[11]. This taxonomy categorizes cognitive processes into six levels. This study will focus specifically on the first four levels: Remember, Understand, Apply, Analyse and Evaluate.

2.2.2. Barrett's Taxonomy of Reading Comprehension

Barrett's taxonomy of reading comprehension presents a categorizes reading comprehension questions into five distinct levels based on the complexity of understanding the text[12]. This study focuses primarily on the first three levels: Literal Comprehension, Reorganization, and Inferential Comprehension for they form the largest proportion of reading comprehension questions[13].

Revised Bloom's taxonomy provides a broader perspective on cognitive processes while Barrett's taxonomy offers a detailed classification of reading comprehension questions.

As shown in **Figure 1**, to answer literal comprehension questions, learners should develop their ability of Remember and Understand, while to figure out Reorganization, learners have to use Remember, Understand, Apply and Analyse.
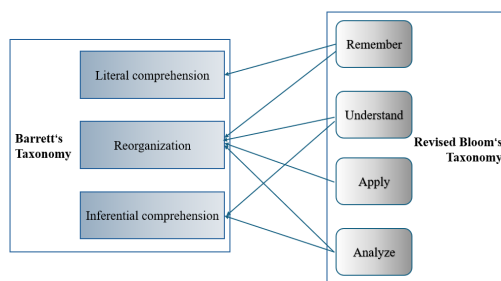

Figure 1. Taxonomies and their application in Module Development.

2.3. Theories Related to the Study

2.3.1. Schema Theory

Schema theory, as proposed by Bransford and Johnson[14], explains how knowledge is structured and utilised to comprehend and interpret information. Comprehension is deriving meaning from text, and involves the activation of readers' existing knowledge (schemas) to construct meaning. Essentially, Schema theory delineates how readers leverage prior knowledge to comprehend and learn from texts. According to this theory, learners' reading proficiency is influenced by three key schemas: language schema (pertaining to vocabulary, idiom, syntax, and grammar), content schema (comprising familiarity with the topic and background knowledge), and formal schema (understanding text organization and genre conventions). See **Figure 2**. These schemas interact dynamically with text elements to facilitate comprehension. Effective comprehension hinges on the reader's ability to connect textual material with their existing knowledge[15].

In this research, schema theory guided the selection of reading texts and facilitated vocabulary and culture topic adaptation in the reading modules, ensuring alignment with students' existing knowledge and enhancing their comprehension of new information.

Figure 2. Schema Theory.

2.3.2. Lev Vygotsky's Sociocultural Theory

Lev Vygotsky's Sociocultural Theory posits that human cognitive and behavioral development unfolds within specific cultural and historical milieus[16]. Vygotsky highlights the significance of cultural experience and background knowledge in the acquisition of new knowledge, particularly in language learning[17]. Vygotsky's Sociocultural Theory offers essential theoretical underpinnings for educational practices, emphasizing the influence of cultural and social contexts on individuals and asserting the need for education to consider students' cultural and social backgrounds. In this study, the researcher developed an English reading comprehension module on Chinese culture based on sociocultural theories, screened reading texts on Chinese culture students' background knowledge, to promote the students' comprehension of the English language and to increase the accumulation of knowledge related to Chinese culture.

In summary, the researchers used a multitude of theo-

ries and techniques to guide the development of the ERCMs, as illustrated in **Figure 3**.
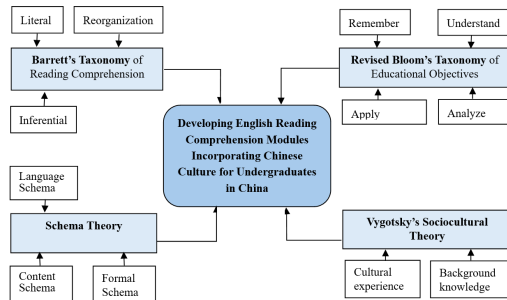

Figure 3. Theoretical Framework of the Study.

3. Methodology

A mixed methods approach was used in this study. Hypothesis 1 was answered by taking the results of the quantitative analysis of students' reading comprehension scores and research Hypothesis 2 was answered by analysing qualitative data from classroom observations and interviews.

4. Development of English Reading Comprehension Modules

The process of module development follows the procedure of the ASSURE model[18], which contains Analyse, State, Select, Utilise, Require, and Evaluate, aiming at enhancing teaching and learning effectiveness. Its six steps applied in this research were shown in **Figure 4**.
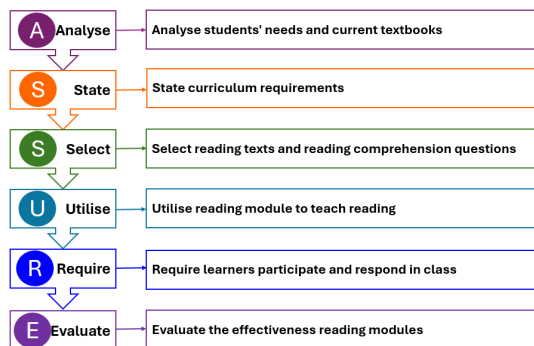

Figure 4. ASSURE Model and its application in Module Development.

4.1. A-Analyse Students' Needs and Current Textbooks

4.1.1. Analyse Students' Needs Through Pre-Test

A pre-test was conducted on 136 freshmen and sophomore non-English major students in a public university in China to assess their reading comprehension abilities and analyse their needs. The pre-test included nine texts of varying difficulty levels, ranging from easy to difficult, with corresponding comprehension questions. The texts encompassed literal, reorganization, and inferential comprehension questions. The pre-test results revealed an average score of 33.01 out of 60, indicating reading performance across all comprehension question types. Specifically, students scored highest in literal comprehension (65.4%), followed by reorganization (54.2%), and lowest in inferential comprehension (46%). Overall, the analysis outbursts the students' inadequate mastery of common reading comprehension question types[19].

4.1.2. Analyse the Current Textbook

The study analyses the third edition of *New Horizon College English*, a widely used textbook for undergraduate English education in China. Despite its endorsement by the Chinese Ministry of Education, the researcher found only 4 texts out of all 64 texts touches on Chinese culture, accounting for merely 6%. This glaring absence highlights a significant deficiency in current textbooks, which fail to adequately expose students to Chinese culture.

The results of these analyses suggest that there is a need to develop teaching materials for College English courses that incorporate Chinese cultural content, both to improve students' English reading comprehension ability and to promote their understanding of Chinese culture.

4.2. S-State Requirements of the College English Curriculum Requirement 2020

The study stated the requirements for undergraduates' English reading proficiency and cultural literacy outlined in *The College English Curriculum Requirement 2020* by the Ministry of Education of China[3]. This document sets three objectives for reading proficiency levels: Basic, Improved, and Advanced, each specifying requisite comprehension skills and reading strategies. These objectives align well with both Barrett's Taxonomy of Reading Comprehension and the Revised Bloom's Taxonomy of Educational Objec-

tives, ensuring a comprehensive and structured approach to developing students' reading comprehension skills. Additionally, the curriculum mandates the cultivation of cultural literacy alongside language proficiency, emphasizing the integration of cultural content throughout the curriculum.

4.3. S-Select Reading Texts and Reading Comprehension Questions

The module consists of reading texts and reading comprehension questions, in the third step "Select", the researcher selected and constructed the reading texts and reading comprehension questions respectively.

4.3.1. Select Reading Texts

The researcher focused on selecting texts for the ER-CMs while ensuring alignment with Chinese cultural themes. In line with *The College English Curriculum Requirement 2020*[3], the researcher sourced topics from reputable websites and consulted professors in the School of History and Culture at Zhengzhou Normal University to identify 45 typical Chinese cultural topics, covering diverse aspects of daily life.

The traditional Chinese festivals developed from the ancient ancestors cover primitive beliefs, sacrificial culture, astronomical calendars, arithmetic, etc., clearly record the rich and colorful social life and cultural content of the ancestors of the Chinese nation[20]. For example, during the Chinese New Year - Spring Festival, people are encouraged to stay up for the whole night on New Year's Eve to celebrate the coming New Year; on the second day of the New Year, married women will visit their mother's home; on the fifth day, Chinese welcome the God of Wealth because that day is his birthday... Each day of the Spring Festival has different traditions. The researchers select five traditional festivals and some customs and calendars as reading texts for the modules. See **Table 1** for details.

Chinese opera, shadow puppetry, Kung Fu, Chinese folk music and so on are the best of the traditional Chinese performing arts[21]. Among them, Kunqu is the origin of all kinds of operas, and Peking Opera is the most popular[22]. In shadow puppetry, the figures of characters carved from animal skins are illuminated by light to perform a story. Chinese Kung Fu combining fitness, performance, physical therapy and fighting, has a long history and is popular[23]. The

dragon is the god of rain for the Chinese and had a remarkable impact during the agricultural era. The dragon dance developed from the Han Dynasty (around 206 BC) when people danced for rain[24]. These topics were chosen to give a special perspective on performing arts.

In the development process of Chinese cultural history, handicraft is one of the main contents running through it[25]. There are kinds of famous porcelains in Jingdezhen, the capital of porcelain art in China, some of which make a wonderful sound when tapped, some are as beautiful as jade, and some are hollow out like lamps, each with its own characteristics. Embroidery, including silk thread embroidery, feather embroidery, and even hair embroidery, is one of the traditional Chinese folk handicrafts and has a history of more than 3,000 years in China[26]. It is the art of designing and crafting fabric with needles and fibers. A good embroidery work can achieve the embroidered creature as if it were alive. Han fu is a collection of a variety of handicrafts in one, not only rich and beautiful in style, but also reflects the different social status levels.

Traditional Chinese architecture is the carrier of Chinese culture and national characteristics[27], including palaces, temples, pagodas, dwellings and gardens. Beijing as the capital city, has a lot of architecture treasures. The Forbidden City, once only used as a residence and office for the emperor, is now a museum for citizens. Shadow wall is a special form in buildings, it tells various messages[27]. The reading module texts tell you more about all this.

China's vast geographical area with many ethnic groups and natural conditions vary greatly, resulting in the diverse characteristics of Chinese cuisine. On the whole, it has formed a dietary tone of sweet in the south, salty in the north, spicy in the east and sour in the west[28]. Various foods associated with festive traditions, such as mooncakes and glutinous rice balls, are also unique in flavor. China is also known for its long history of tea. The researcher selected text "Chinese Food Styles" to give an overview of Chinese food; the text introducing the distinctive food item – "Mooncake"; and the text "Diancha" to introduce readers to a historical tea culture form that combines drawing and tea[29].

What's more, interesting reading texts about scenic and historical spots, literature and Philosophers, Chinese symbols are also selected to make the modules readable and

knowledgeable.

The selection of reading texts involved stringent criteria, prioritizing content in native English and relevance to Chinese cultural contexts. A total of 45 texts were meticulously selected, with easier texts allocated to Module 1 and more challenging ones to Module 3, while the remainder was confined to Module 2. Additionally, texts underwent revisions to tailor length and vocabulary difficulty to suit each module's proficiency level. Integration of similar-themed texts and vocabulary modifications were undertaken to enhance readability and comprehension.

For instance, in Module 2, the text on Chinese food styles underwent pruning to an appropriate length, while for Module 3, texts were amalgamated from multiple sources to ensure comprehensive coverage. Vocabulary adjustments were made to facilitate understanding, with uncommon terms replaced by high-frequency words or supplemented with Chinese translations as needed. The final selection resulted in 15 texts per module, each intricately crafted to align with the thematic focus and English proficiency level of the respective modules.

The final selected themes and topics are shown as below in **Table 1**.

Table 1. Selected Themes and Topics for Texts of ERCMs.

Themes	Topics				
Festivals	Spring Festival Customs	Mid-Autumn Day	Qing Ming	Double-Nine Festival (Festival for seniors)	Qi Xi (Chinese Valentine's Day)
Performing Art	Peking Opera	Kunqu Opera	Kung Fu	Shadow Puppetry	Dragon Dance
Handicraft	Paper Cutting	Embroidery	Chinese Costume-Han Fu	Art in a Flowerpot	Famous Porcelains in Jingdezhen
Architecture	Gardens	Beijing	The Great Wall	If these walls could talk - Shadow Wall	The Forbidden City
Customs & Calendar	Five Elements	Red Envelope	Chinese Zodiac	Twenty-Four Solar terms	How to plan a traditional wedding?
Scenic & Historical Spots	Silk Road	Mount Tai	Confucius Temple	Terracotta Warriors and Horses	Water Towns (Chinese Venice)
Literature & Philosophy	Shell-and-bone Script	Chinese Idioms	Ancient Philosophers	Qu yuan (the first poet of China)	
Chinese Symbols	Giant Panda	Acupuncture	Yellow River	Are Chinese dragons' evil?	
Food & Drink	Mooncakes	Food styles	The Art of Tea -Dian cha		
Others	Chinese Aesthetics	Numerical Meanings	Chinese Thinking Style	Once popular sports in China	

The researcher also matches the selected texts with beautiful illustrations that are highly relevant to the texts. Examples are shown in **Figure 5**. These illustrations not only arouse readers' interest and reduce reading anxiety, but also help readers to understand the text to a certain extent.
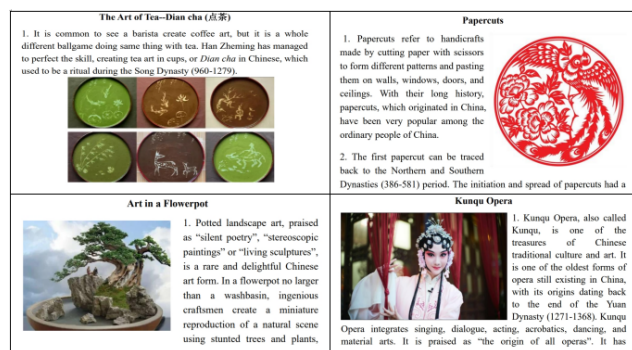

Figure 5. Examples of illustrations in reading comprehension texts of ERCMs.

4.3.2. Select Reading Comprehension Questions

The development of effective ERCMs for undergraduates entails constructing well-designed comprehension questions aligned with the selected reading texts. Drawing on the insights of Pearson and Gallagher, who emphasize the pivotal role of comprehension questions in fostering critical thinking[30], the researcher utilised Barrett's Taxonomy of Reading Comprehension and Revised Bloom's Taxonomy as a guide in developing the comprehension question.

Adhering to Barrett's Taxonomy's first three levels[12] — literal comprehension, reorganization comprehension, and inferential comprehension — alongside the first four levels of Revised Bloom's Taxonomy[11] — remember, understand, apply, and analyse — the researcher ensured a comprehensive coverage of cognitive dimensions in question formulation.

An example shown in **Figure 6**, in Module 3 Unit 5 Text C, entitled "Famous Porcelains in Jingdezhen"[31], introduced four famous porcelains, and describes each of their characteristics. One of the reading comprehension questions is:

This is a reorganization question. Students apply four levels of revised Bloom's Taxonomy when answering this question.

First, read the introduction and description of each kind of porcelain in the text (Remember); Then, get the useful information especially the characteristics of each porcelain (Understand);

1. Which of the following is in the order of "famille rose porcelain linglong porcelain, color-glazed porcelain，blue and white porcelain"?

| Picture 1 | Picture 2 | Picture 3 | Picture 4 |

A. Picture 2, Picture 1, Picture 3, Picture 4
B. Picture 1, Picture 2, Picture 3, Picture 4
C. Picture 3, Picture 1, Picture 2, Picture 4
D. Picture 3, Picture 2, Picture 1, Picture 4

Figure 6. An example of a reading comprehension question in Module 3.

Next, analyse the message from the pictures (Analyse);

Last, match the information gained in the text to a suitable picture (Apply).

Based on the Barrett Taxonomy, the researcher constructed comprehension questions to suit the content and objectives of each text. Each module consists of three units with multiple reading texts, with five comprehension questions for each text. Specifically, Text A focused on literal comprehension, Text B on reorganization comprehension, and Text C on inferential comprehension.

Across the entire three modules, a total of 225 questions were carefully designed, with each question contributing one point, thus summing up to 75 points per module. This structured approach to question selection and construction ensures a comprehensive assessment of students' reading comprehension abilities while maintaining alignment with the modules' overarching objectives. At the same time, in order to increase readability, researchers also considered the interest and practicability of reading comprehension when selecting and constructing questions.

For example, in **Figure 7**, the title of Module 2 Unit 5 Text B is "The shell-and-bone script" [31], Paragraph 5 is like this:

5. It was said that Cangjie, the legendary inventor of Chinese writing, got his ideas from observing animals' footprints and birds' claw marks on the sand as well as other natural phenomena. He then started to work out simple images from what he conceived as representing different objects such as those that are given below：
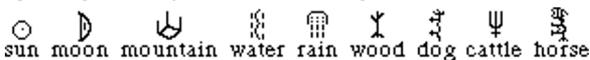

sun moon mountain water rain wood dog cattle horse

Figure 7. Paragraph 5 of reading comprehension text "The shell-and-bone script".

One of the questions based on this paragraph can be seen in **Figure 8**:

4. Which of the following interpretations of the oracle is most likely to be wrong? (Reorganization)

A. = It rains in the mountains at night.

B. = Tying a cow to a tree on a sunny day.

C. = Dog sweating in the heat under a tree.

D. = Water flow down the hill when it rains.

Figure 8. A reading comprehension question of "The shell-and-bone script".

These symbols and motifs easily arose students' interests. They need to reorganize the information in the text in addition to their background knowledge and common sense to synthesize in order to get the correct answer. During this process, students understand the text at the same time know more about Chinese culture.

4.4. U-Utilise the ERCMs

During the pilot study phase, the effectiveness of the ERCMs was evaluated through classroom implementation in collaboration with three senior College English teachers. The modules were tailored to different proficiency levels (elementary, intermediate, and advanced) and were integrated into regular College English classes, with each module spanning five weeks consisting of 90-minute sessions conducted once a week. Each week commenced with an introduction to the module objectives, followed by pre-lecture activities where students engaged with the assigned reading texts and comprehension questions. Subsequent sessions involved in-depth exploration of the texts through activities such as watching relevant videos, explanation of challenging content, group discussions, and reinforcement of problem-solving strategies for tackling comprehension questions.

4.5. R-Require Students to Participate and Response in Class

This step involves students engaging actively in the learning process. This research identifies several components of student participation, including brainstorming, group work, pair work, topic discussion, expressing and sharing, reading and answering, note-taking, and self-assessment. Classroom activities aligned with these components include but not limited to⬜brainstorming Chinese New Year customs, creating guide maps of historical monuments in groups,

describing favorite mooncakes in pairs, discussing the significance of blue and white porcelain, and sharing preferences for Chinese costumes etc. These activities are carefully integrated with the themes and content of the ERCMs.

4.6. E-Evaluate the Validity and Reliability and Effectiveness of the ERCMs

The final step of developing the ERCMs is to measure the validity, reliability and effectiveness.

4.6.1. Validity of the Developed Reading Modules

The validity of the ERCMs was established through an evaluation by three experienced content experts in College English teaching. Their assessment involved checking the reading comprehension texts and questions using a 5-point scale to gauge content validity. The results, detailed in **Table 2**, demonstrated high approval rates from the experts,

affirming the validity of Modules 1, 2, and 3. Texts and questions that received lower scores underwent revisions based on expert feedback to ensure their validity.

Table 2. Mean score given by content experts to determine validity.

	Module 1	Module 2	Module 3
Total Mean score	4.70	4.80	4.86
Mean score of Texts	4.60	4.91	4.80
Mean score of Questions	4.72	4.77	4.87

Notes: Full score is 5.

4.6.2. Reliability of the ERCMs

Reliability was evaluated using internal consistency tests conducted in the pilot study. In addition to Cronbach's Alpha, the Kuder-Richardson Formula 20 was also employed to assess reliability in the pilot study. This method, suitable for objective questions like multiple-choice items, yielded high reliability values for literal, reorganization, and inferential comprehension in all modules, indicating satisfactory internal consistency. See **Table 3**.

Table 3. Reliability values in literal, reorganization, and inferential comprehension of reading modules.

		Reliability by Kuder-Richardson Formular 20	Reliability by Cronbach's alpha in SPSS
Module 1 (for elementary students)	Literal Comprehension	0.8545	0.855
	Reorganization	0.8145	0.815
	Inferential Comprehension	0.8566	0.857
Module 2 (for intermediate students)	Literal Comprehension	0.7437	0.744
	Reorganization	0.7481	0.748
	Inferential Comprehension	0.7655	0.766
Module 3 (for advanced students)	Literal Comprehension	0.7526	0.753
	Reorganization	0.7128	0.713
	Inferential Comprehension	0.7219	0.722

4.6.3. Evaluate the Effectiveness of Reading Modules

The evaluation of the ERCMs revealed promising outcomes in improving undergraduates' reading comprehension abilities. Across all three modules, significant progress was observed in students' mean scores from the initial unit to the final unit, indicating the effectiveness of the modules. In **Figure 9**, Module 1 demonstrated a notable increase in mean scores from 7.70 in Unit 1 to 10.70 in Unit 4, reflecting improvement in literal, reorganization, and inferential comprehension. Module 2 and Module 3 similarly exhibited substantial improvements in reading comprehension scores throughout their units. However, challenges were identified, such as difficulty in identifying the types of reading comprehension questions,

particularly in mixed question formats (Unit 5), leading to a decrease in scores. Despite these challenges, the modules proved effective in enhancing literal, reorganization, and inferential comprehension skills among students.
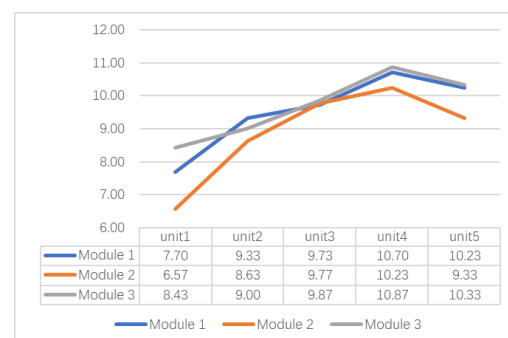
	unit1	unit2	unit3	unit4	unit5
Module 1	7.70	9.33	9.73	10.70	10.23
Module 2	6.57	8.63	9.77	10.23	9.33
Module 3	8.43	9.00	9.87	10.87	10.33

Figure 9. Pilot results reading performance of ERCMs.

5. Results

5.1. Students' Performance Using the ERCMs

The researcher analysed the score of 131 students in the main study using the ERCMs. It includes students' overall reading performance and performance in literal, reorganization and inferential comprehension, which has shown students' performance in Module 1, Module 2 and Module 3 classes.

As can be seen from **Table 4**, students using Module 1, Module 2 and Module 3 illustrated varying degrees of improvement.

As can be seen in **Figure 10**, the reading comprehension scores of the students who used the modules improved to varying degrees, proving the effectiveness of the modules in terms of performance data.
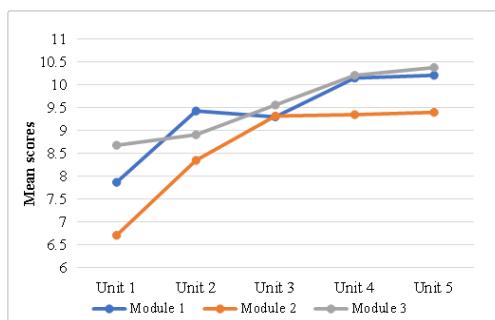

Figure 10. Mean scores among Module 1, Module 2 and Module 3.

The results from the analysis of students' scores using the ERCMs provide strong support for **Hypothesis 1**: The use of English reading comprehension modules incorporating elements of Chinese culture significantly improved students' English reading comprehension ability. Across all three modules, students showed significant improvements in their overall reading ability, as well as in literal, reorganization, and inferential comprehension.

5.2. Results from Classroom Observation

The researcher did a frequency distribution of 13 observation points for teachers and 13 observation points for students on the Classroom Observation Checklists. By analyzing the classroom observation Checklists, the researcher found six points occurred very frequently with teachers and seven points were very evident to students, as shown in Table 5:

The analysis of the classroom observation checklists revealed that teachers and students were able to adapt to the use of ERCMs for teaching and learning English reading. The teaching process and content and the users' own cultures were able to integrate. Positive classroom results were obtained, including students were interested in the content of their learning; they were able to respond actively in the classroom; they expressed cultural confidence in their moods and performances; they could use their pre-existing knowledge about Chinese culture to aid their learning and comprehension; They could objectively self-evaluate.

5.3. Results from Interviews

Nine participants, including teachers and students, volunteered to participate in interviews. Thematic analysis, following Braun and Clarke's six-step process[32], was applied to interview transcripts. Analysis revealed such themes:

(a) Challenges before Using ERCMs: Participants cited difficulties in reading comprehension due to language barriers, lack of comprehension skills, minimal exposure to Chinese culture in English materials, negative emotions, and slow reading speed.

> *"It's **hard to read and answer** reading comprehension questions **before I use the Module** because I didn't know so many words at the beginning, **I read slowly and was pressed for time**, so **I felt it was hard and couldn't understand the text**"* (Student Interviewee, used Module1).

(b) Performance after Using ERCMs: Users reported increased language proficiency, comprehension skills, cultural knowledge, emotional improvements, and enhanced reading speed, leading to a newfound interest in English and Chinese culture.

> *"After learning the module **I can answer almost all questions**. ... I used to take long time to read an article, but **now I have mastered the reading skills** and know how to determine the key words for the three types of common reading comprehension questions, so now **I am**

Table 4. Mean scores and percentage students gain in each unit using ERCMs.

		Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
Module 1	Mean	7.87*	9.43	9.30	10.15	10.21
	Percentage	52.47%	62.87%	62.00%	67.67%	68.07%
Module 2	Mean	6.71	8.35	9.32	9.35	9.40
	Percentage	44.73	55.67%	62.13%	62.33%	62.67%
Module 3	Mean	8.68	8.91	9.56	10.21	10.38
	Percentage	57.87%	59.40%	63.73%	68.07%	69.20%

Notes: The full score in every unit is 15.

Table 5. Results of the frequency distribution of classroom observation.

	Teachers	Students
Observation results	a) making learning goals clear to students, b) making classroom instruction culturally relevant, c) containing historical research, d) helping students understand culture in multiple dimensions, e) giving students the opportunity to do self-assessment, f) guiding cultural self-confidence.	a) being interested in reading texts about Chinese culture, b) responding positively in class, c) demonstrating cultural confidence, d) being able to use prior knowledge about Chinese culture, e) having clear learning goals, f) being able to relate learning to culture, and g) being able to objectively self-evaluate.

reading and comprehending very fast, and the accuracy is getting higher. (Student Interviewee, used Module 2).

(c) Benefits of ERCMs: Users noted improvements in reading comprehension, cultural literacy, and Critical Reading Thinking, expressing enhanced ability to share Chinese culture and increased reading efficiency.

> *"My English **reading capacity has improved**, especially in literal comprehension, reorganization and inferential comprehension. ...using this module, I have **gained a deeper understanding of Chinese culture**. I feel that I can now introduce and share Chinese culture with others.... I am now **faster than before in all kinds of reading texts**."*(Student Interviewee, used Module 3)

> *"...they were **very interested to use the module** because the students already knew some knowledge of Chinese culture, and reading the module text was **not as repulsive as reading other English materials, the acceptance was higher**.* (Teacher Interviewee, used Module1)

The results from the analysis of classroom observations and interviews using the ERCMs provide strong support for **Hypothesis 2**: The study also confirms that these modules enhanced students' understanding of Chinese culture. This finding underscores the importance of integrating cultural content into language education to foster cultural literacy and intercultural communication skills.

6. Discussion

To develop a list of complete Reading Comprehension Modules incorporating Chinese culture for undergraduates in China, this study delved into text selection and comprehension question construction, drawing parallels with existing literature while also presenting unique insights.

Similar to a previous study of Tan and Mante-Estacio, this research emphasized the significance of selecting reading materials with Chinese cultural themes[33]. The findings revealed a notable improvement in students' English reading levels after engaging with modules featuring Chinese culture-themed texts. This aligns with Sahyoni et al.'s assertion that materials grounded in national culture enhance students' learning experiences within their cultural context, as opposed to isolating English learning from familiar cultural references[34].

Furthermore, the study employed Barrett's taxonomy to design comprehension questions, focusing on literal, reorganization, and inferential comprehension levels. This approach echoes findings from Aynalem and Tesmand[13], indicating that literal comprehension predominates in reading comprehension tasks. By structuring questions according to Bloom's Taxonomy levels, the study ensured a balanced distribution of comprehension questions, facilitating a systematic increase in difficulty levels. This methodology is consistent with previous research emphasizing the importance of maintaining question order and balancing comprehension levels[13].

Regarding students' performance using ERCMs, the post-test results indicated a significant improvement, confirming the effectiveness of ERCMs in enhancing reading abilities. The varying levels of improvement across literal, reorganization, and inferential comprehension aspects among students using different modules echo findings from De-la-Peña and Luque-Rojas[35] and validate the adaptability of ERCMs to address diverse proficiency levels and comprehension needs.

The positive classroom outcomes observed, including increased student engagement, cultural confidence, and self-evaluation, resonate with previous research emphasizing the benefits of culturally embedded materials in fostering language skills and self-confidence[36, 37]. Additionally, the findings underscore the importance of activating students' background knowledge through culturally based textual content and responsive teaching, as highlighted in the study by Bensalah and Guerroudj[15].

Furthermore, the observed increase in interaction and teamwork among students using ERCMs aligns with Alghonaim's[38] findings on the correlation between participation in classroom activities and reading comprehension levels. This underscores the value of incorporating culturally based textual content to foster a conducive learning environment[39].

7. Conclusions

This research aimed to improve undergraduates' reading skills and deepen their understanding of Chinese culture through the development and implementation of ERCMs at a public university in mainland China. This study applied the ASSURE model successfully develop ERCMs of varying levels of difficulty with Chinese cultural contents. The validation process including content experts' evaluation and pilot testing confirmed the validity and reliability of the ERCMs for wider implementation.

Regarding the effectiveness of the modules, students using the ERCMs showed significant improvements in English reading comprehension at three levels: literal comprehension, reorganization and inferential comprehension. In addition, observations and interviews revealed that students' understanding of Chinese culture deepened, their cultural self-confidence increased, and their cultural literacy improved.

Future research should continue with this work by developing materials with higher-level comprehension questions and conducting larger-scale studies involving students from different universities. These efforts will further improve EFL learners' English reading skills based on cultural understanding.

Author Contributions

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Institutional Review Board Statement

The study was approved by the Committee for Academic Ethics and Moral Construction of Zhengzhou Normal University (6 June 2022).

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Written informed consent has been obtained from the participants to publish this paper.

Data Availability Statement

Relevant data from this study can be obtained on reasonable grounds by requesting the authors by email.

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Conflicts of Interest

The authors declare no conflict of interest.

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