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Optimization of the cultivation mechanism of English intercultural communication ability in colleges and universities assisted by artificial intelligence

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SUMMARY: *Cross-cultural communication competence is defined as the capacity to be effectively communicative with persons of various cultures and identities. It has become one of the most important issues in economic development since the beginning of globalization. In this paper, the author discusses the optimization of mechanisms of developing cross-cultural communication competence in college English education, using the use of artificial intelligence technology in educational practice. There was a representative of 110 students of W college. Questionnaire surveys were undertaken to gather information on the intercultural communication competence of the students, which was summarized and analyzed to get an overview of the current state of their English intercultural communication abilities. The college English intercultural communication classroom was put into three stages integrating cultural schema theory and making AI technology an operational tool: pre-class motivation, in-class facilitation, and post-class reinforcement. The Welch t-test was used as a verification method of efficacy of the proposed instructional model design. Using AI technology, such a classroom model positively impacts students intercultural communication competencies in four aspects: knowledge, attitude, affect, and behavior ($P=0.000<0.05$) With this approach, it is possible to obtain practical and efficient strategic references to develop and optimize intercultural communication competency development mechanisms in college English education.*

KEYWORDS: *cross-cultural communication competence; cultural schemata; college English teaching; artificial intelligence; Welch's t-test*

1 Introduction

Because of the growing number of international exchanges, acquisition of a second language is one of the top routes to widening people's worldviews. The place of English in international trade, academic exchange, and cultural discourse cannot be filled by any other language. Effective communication across cultural borders has become a main issue in higher education around the world. It is supposed that colleges should not just pass on linguistic information, but they must also have the intercultural communication competence (ICC) that allows them to manage the culturally diverse environment. Nonetheless, in spite of decades of curricular change, the present-day teaching of English in colleges today in most cases emphasizes grammar precision and test preparation at the expense of developing cross-cultural consciousness and communicative flexibility among students. Such a mismatch between what

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is taught and what is actually needed has led to a continuous gap: most graduates have sufficient knowledge of language but are unable to communicate in a culturally appropriate and effective manner. The recent growth in artificial intelligence (AI) technologies brings about new opportunities as well as urgent threats to the paradigm shift in English teaching. Recent findings indicate that AI-based tools have the potential to imitate genuine intercultural interactions, supply individualized feedback, and afford access to abundant resources, which are highly promising in overcoming constraints associated with traditional classroom instruction. However, the problem of the systematic incorporation of AI technology into traditional cognitive and cultural learning theories to create an operational teaching model continues to be poorly researched. In this research, it is proposed to fill up this gap and present an AI-supported classroom model based on cultural schema theory that will help maximize the cultivation system of English intercultural communication competence in higher education environments.

The paper initially describes the experimental design used to measure the English intercultural communication competence of the college students, which includes three major areas: conceptual framework, experimental methodology, and sample selection. An English intercultural communication competence questionnaire was prepared. After carrying out reliability and validity testing to confirm the structure and contents of the questionnaire, descriptive statistics were performed on the questionnaire data to provide the summary of the present level of intercultural communication competence of the experimental sample. The subsequent step, according to cultural schema theory, is to suggest a classroom model of developing intercultural communication competence in higher education that uses artificial intelligence technology as an implementation strategy. The effectiveness verification method chosen to test the designed cultivation model is the Welch t-test whose main operation steps are illustrated. Then an experimental group and a control group are formed in the sample. To confirm auxiliary efficacy of artificial intelligence in fostering intercultural communication competence, the pre-post performance of the two groups is compared using four dimensions, i.e., knowledge, attitude, affect, and behavior. Finally, the research centers on the pre- and post-experimental alterations in the attitudes of the experimental sample towards intercultural communication to further assess the credibility of the proposed classroom model.

2 Literature Review

English has a critical role to play in second language acquisition as a global lingua franca [1, 2]. As major institutions of holistic quality education, universities should focus on not just imparting linguistic information through English teaching but also on nurturing the cross-cultural communication abilities of students [3-5]. Nevertheless, recent tendencies suggest that many college English programs are currently unable to achieve significant advancements in students cross-cultural communication skills, which is why teaching quality cannot be improved [6-8]. In the context of more advanced artificial intelligence (AI) technologies, college English education stands before new challenges and opportunities of development.

Inter-cultural communication is a form of interaction between native speakers and non-native speakers, as well as any type of communication among people who have different linguistic and cultural backgrounds [9, 10]. On the basis of language proficiency, the students should develop profound knowledge of cultural traditions and social customs of the country of the target language, which is one of the key components of developing skills of cross-cultural communication [11, 12]. At present, there are many challenges in the college

English teaching in terms of intercultural communication competence development, which is largely expressed through limited teaching materials and boring teaching strategies that can greatly impede the growth of such competencies [13-15]. The field, however, presents a set of unique benefits when it comes to AI, i.e. language learning and simulation training, personal mentoring and improving oneself, as well as sharing resources and accessing information [16].

The first point is that AI technology could be used to use language processing techniques to enable learners acquire communication skills in a variety of languages. It may also be used to simulate cross cultural communication situations quite well allowing learners to train in virtual worlds and consequently develop their cross cultural communication skills over time [17-20]. According to reference [21], AI technologies such as natural language processing in education can be used to promote cross-cultural communication and improve language learning as it enables learners to get rid of language barriers with real-time translation and grammar correction services. The Cross-Cultural Intelligent Language Learning System (Reference [22]) is a system designed to incorporate AI language processing into the improvement of cross-cultural communication capabilities. It had been evaluated in terms of its effectiveness in practical application, which proved to have improved significantly the cross-cultural competences of the learners. Reference [23] has created an interactive virtual reality learning environment to test whether it can be used to facilitate the development of cross-cultural competence among the students during the learning process. Its usefulness was tested, and it was observed that there was a great improvement in the level of students cross-cultural communication skills. The proposed approach to developing cross-cultural communication skills in college students in immersive environments is discussed in reference [24]. This solution combines a three-dimensional model of data management and a central perspective to implement interactive activities in immersive environments, which will play a vital role in improving the competencies of students in cross-cultural communication.

Third, AI technology has the possibility to take into account various aspects of learners needs and interests to offer customized support [25, 26]. Through the analysis of data to modify the content and methods used in teaching, it has a positive effect on nurturing the intercultural communication competence of the learners [27, 28]. Reference [29] notes that conventional approaches to teaching English do not pay attention to developing cross-cultural communication skills. The author stresses the fact that creation and use of technologies, including AI, big data and virtual reality, can be regarded as a source of innovation in English education and especially when it comes to personalized instruction. The reference [30] expounds on the advantages of applying AI technology in language instruction, such as personalized feedback and cross-language interaction, and discusses the use of AI technology in cross-language learning. The reference [31] is dedicated to the fact that AI gives new directions and momentum to intercultural teaching in English education in the context of the Chinese program of the Internet Plus. In this regard, it is going to combine AI technology with English intercultural teaching to examine the effectiveness of AI in improving the intercultural communication skills of college students. Literature [32] develops and examines the old MOOCs through cloud computing and AI technologies and suggests a new enhanced model. Experiments show that the current model has high performance and significantly increases the effectiveness of English intercultural teaching.

Moreover, AI technology can overcome geographical limitations, combine resources of cross-cultural communication, and offer learners with comprehensive and personalized learning materials that will help them understand the cultural features of other cultures [33, 34]. Reference [35] is a discussion of cross-cultural views of AI in the context of education using case studies, which shows that AI makes it possible to personalize learning and has an

excess of teaching materials but requires focusing on ethical aspects, inclusiveness, and the relationship between teachers and students. It suggests creating inclusive and ethically sound AI policies. Reference [36] lists the drawbacks of conventional English instruction in terms of developing cross-cultural communication competencies. This is explained by the fact that deep learning technologies, which are based on developments in AI, create new opportunities in teaching English. These technologies use intelligent systems to examine students cultural background as well as learning requirements to deliver customized learning materials. Literature [37] looks at different ICT tools and techniques, such as speech recognition software, mobile learning programs, and AI pronunciation programs, and its effect on language acquisition. According to the literature review, it indicates that these tools have a significant positive impact on the learning experience. Literature [38] reveals a variety of issues in college English classes and discusses ways to increase the effectiveness of teaching with the help of AI technology. The findings show that AI usage in teaching offers rich educational resources, which satisfy the individual needs of students and increase the effectiveness of teaching.

3 Current Status of Cross-Cultural Communication Competence in English Among College Students

3.1 Experimental Design

3.1.1 Design Approach

The primary purpose of this experiment has been to answer three major questions. First, it intended to determine the extent of intercultural communication competence among students in English by using questionnaires and pre-tests. Secondly, it intended to find out what factors in college English teaching may affect the intercultural communication abilities of students. Lastly, it was aimed at creating even better teaching and learning strategies that would develop the attitudes of college students towards intercultural communication and improve their intercultural communication competencies.

3.1.2 Experimental Methods

The present study is based on a mixed-methodology that combines quantitative and qualitative research. The research methods consist of these two elements:

(1) Questionnaire Survey. When the study first began, a questionnaire survey was done to determine how college students perceived intercultural communication. The intention was to get a general idea of what has been happening in English language teaching in the higher learning institutions and to establish some problems that exist.

(2) Teaching observation experiment. A four-month teaching observation experiment was conducted in two sophomore classes at a college from February to June 2022.

3.1.3 Experimental Samples

The experimental population consisted of 110 students of Class A and Class B of the sophomore year at W College with 55 students in every class. In order to enable the experimental processes and further studies and teaching, both of these classes were given the same syllabus; they utilized the same textbooks and workbooks, and adhered to the same English lesson schedules during the experiment. Moreover, the initial test scores showed that there were no substantial cross-cultural communication skills among the students of Class A

and Class B, and it was one of the key dependent variables of this work. Therefore, Group 1 (Class A) and Group 2 (Class B) could be considered as equivalent groups.

3.2 Questionnaire Survey Process and Data Collection

The English cross-cultural communication competency survey questionnaire was designed based on available literature as well as on practical conditions and contains three modules: (P1) Cross-Cultural Communication Knowledge (40 points), (P2) Communication Attitude (30 points), and (P3) Communication Skills (30 points). There are 20 items in the questionnaire with each being allocated 5 points. The module of the Cross-Cultural Knowledge is divided into two subsections, which are (P11) Domestic (20 points) and (P12) International (20 points).

3.2.1 Reliability and Validity of the Survey Questionnaire

In the formal survey, 110 questionnaires were distributed to students in two classes, with all 110 returned as valid responses, achieving a 100.00% response rate. Data analysis of the survey results aimed to understand college students' current proficiency in cross-cultural communication skills, identify instances of cultural aphasia within their native culture, assess whether negative transfer effects occur in their mother tongue culture, and determine areas of strength and weakness. Additionally, five students were randomly selected from each class for in-depth interviews regarding their responses to specific questions. Their self-analysis provided a data foundation for identifying issues and analyzing countermeasures. After revisions and sample expansion, the formally distributed questionnaire underwent further reliability and validity testing, as shown in Table 1.

Table 1: Reliability of the survey questionnaire

Item	Total correlation of corrected terms (CITC)	The α coefficient that has been deleted	Cronbach's α coefficient
Total points	1	0.669	0.81
P11	0.523	0.782	
P12	0.57	0.766	
P2	0.683	0.726	
P3	0.657	0.733	

The calculated Cronbach's alpha coefficient was 0.81 > 0.700, indicating good reliability quality of the research data. All CITC values for the analysis items were >0.50, demonstrating strong correlations among the items and good reliability levels. The standardized Cronbach's alpha coefficient was 0.854. All items passed reliability and validity tests, confirming high data reliability quality suitable for further analysis.

Table 2 shows the validity of the survey questionnaire. The final questionnaire KMO of the validity was 0.7894, which is in between 0.7 and 0.8, which means it is well valid. It supports the fact that the sample data can be used to extract information.

Table 2: The validity of the questionnaire

KMO Value		0.794
Baetlett sphericity test	Approximate chi-square	23045.21
	df	10
	p value	0

The Jarque-Bera test results for the survey questionnaire are presented in Table 3. When it comes to assessing whether the aggregate scores of student survey questionnaire fit into the normal distribution, most of the sample data points are aligned with the straight line. Moreover, from the results in Table 3, it can be seen that the total score variable is not statistically significant (p=0.33 > 0.05) which implies that the total scores of the questionnaires have normal properties and are normally distributed. The sample used in the survey questionnaire is a representative one, and the design of every questionnaire item is fairly sound.

Table 3: The Jarque-Bera test of the questionnaire survey

Name	Total points
Sample size	110
x^2	2.991
df	2
p Value	0.33

3.2.2 Descriptive Statistics and Analysis of Questionnaire Content

The distribution of overall student scores is displayed in Figure 1, and the descriptive statistics associated with the three parts of the questionnaire are given in Table 4. The scores of the students have a general bell shape with slight skewness towards high values. It was found that most students had scores higher than 39 points, which is a sign of high-level overall mastery of the cross-cultural communication competencies. In terms of each individual element, analysis demonstrates that students have high mastery and use foreign cultural knowledge as part of communicative knowledge. Conversely, their proficiency in communicative skills and Chinese cultural knowledge within communicative knowledge is the weakest.

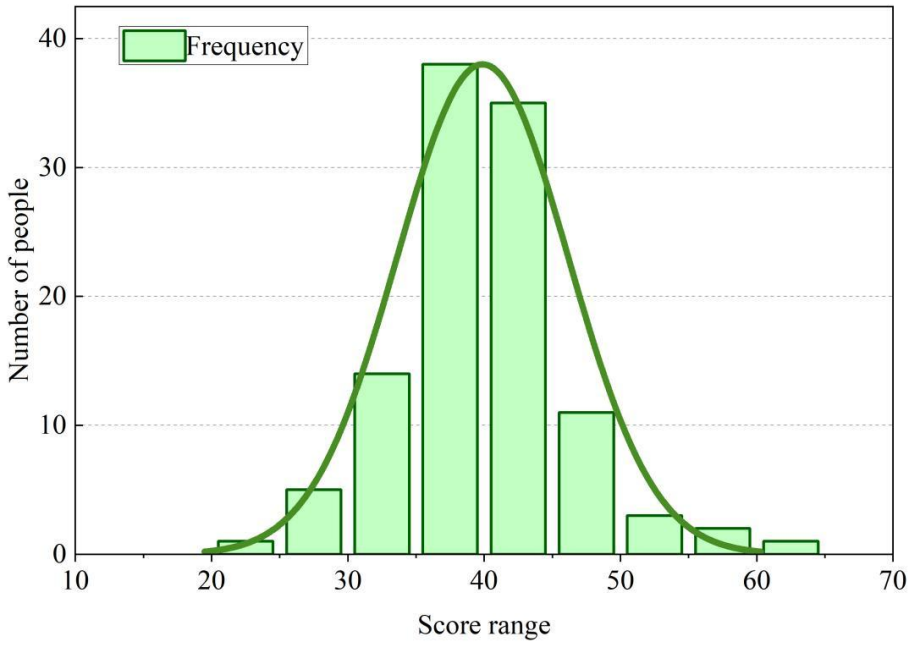

Figure 1: The normal distribution of the total score frequency of the questionnaire

Table 4: Descriptive statistics of the questionnaire content

Item	Total points	P11	P12	P2	P3
Sample size	110	110	110	110	110
Minimum value	28	2	6	11	13
Maximum value	77	14	17	24	26
Acceptance value	60	14	14	18	18
Average	65.1	12.3	15.2	20.4	20.5
Standard deviation	50.119	12.319	8.219	18.419	20.519
IQR	66	13	8	16	19
Variance	51.018	13.018	8.018	4.018	19.018

Combining Figure 1 and Table 4, regarding (P11) mastery of cross-cultural communication knowledge (domestic), the average score for foreign cultural knowledge among students in both experimental classes was 12.3, below the cutoff score of 14.0. This indicates that students' knowledge and understanding of Chinese culture did not meet the passing standard for this section. However, in (P12) mastery of cross-cultural communication knowledge (foreign), the average score for understanding foreign cultures in both experimental classes was 15.2 > 14.0, meeting the passing standard. This indicates a widespread phenomenon of Chinese cultural aphasia among students.

Regarding (P2) cross-cultural communication attitudes, both classes performed relatively well, with an average score of 20.4 exceeding the 18.0 passing threshold and exhibiting low variance (4.018). It implies that intercultural communication attitude development at W college is moderately effective. The majority of students do acknowledge the differences between cultures, have a positive attitude towards cultural diversity and are willing to promote cultural confidence and awareness as well as promoting Chinese culture. On the other hand, examination of particular items shows that even some of those who are culturally open cannot change their language and behavior patterns to match the cultural requirements of foreigners in real-life situations.

Concerning (P3) intercultural communication skills, the highest point attained by students in either class is 26, the lowest is 13, and the mean is 20.5 yet the variance is high at 19.018. It means that although students have a pretty decent attitude to intercultural communication, they are weak at certain intercultural communication skills and cannot reach the passing level.

On average, the students scored 65.1 points and the median score of the students was 66 points. The highest possible score in this questionnaire was 100 points and the passing mark was 60 points. As the mean and median were higher than the passing point it indicated that the intercultural communication skills of the experimental group as a whole were at least at the pass level though they were not on the proficiency level. The difference between the highest and lowest total scores reached up to 49 points which is a huge difference.

4 Design and Effectiveness Evaluation of Cross-Cultural Communication Competency Courses

4.1 Classroom Teaching Model Content

According to the Cultural Schema Theory, cultural education and language instruction go hand in hand and cannot be separated. The present work combines teaching experience with the available theory to build a Classroom Model to Develop Cross-Cultural Communication Competence of College Students Using Cultural Schema Theory, which consists of three

stages, three types, and nine tasks. Figure 2 shows the process flow of the proposed classroom model.

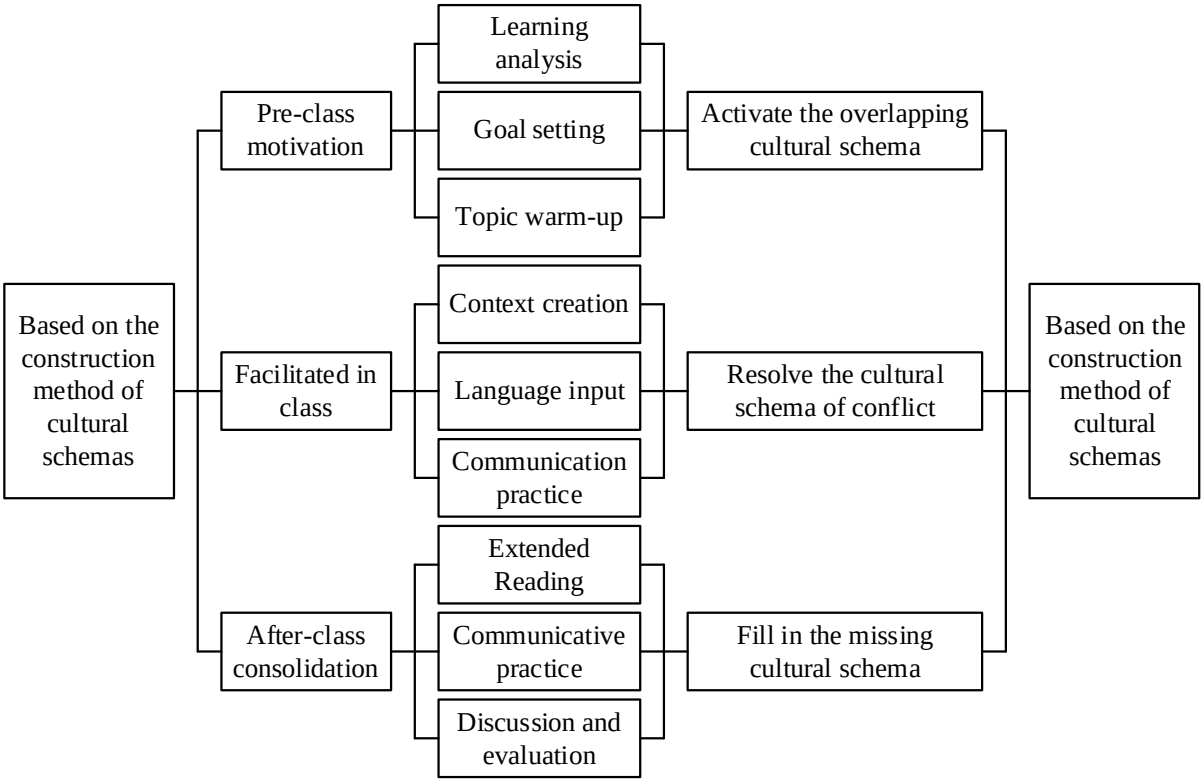

Figure 2: The process of the cross-cultural communication skills classroom model

Based on Figure 2, the construction of the classroom model for intercultural communication skills among college students is primarily divided into three phases: pre-class motivation, in-class facilitation, and post-class reinforcement. Tasks are designed to address three types of cultural schemas—overlap, conflict, and absence—and include: learning situation analysis, goal setting, topic warm-ups, scenario creation, language input, communication practice, extended reading, communication practice, and discussion evaluation. Unlike traditional teaching models, this designed intercultural communication competency classroom model places greater emphasis on student agency and teacher instructional methods. Therefore, its practical implementation relies on artificial intelligence technology for auxiliary support.

In the learning situation analysis task, a Learning Analytics Dashboard (LAD) is employed to automatically analyze students' accuracy rates and response time distributions in pre-class quizzes using clustering algorithms. This enables precise identification of prevalent gaps in cultural knowledge within the class, thereby addressing the problem of imprecise diagnosis based solely on teachers' subjective experience in traditional instruction. In the goal-setting task, an adaptive learning engine stratifies students according to a knowledge graph and automatically pushes differentiated preview resources, resolving the issue that uniform instructional objectives fail to accommodate individual learner differences. In the topic warm-up task, an AIGC content generation tool automatically produces comparative texts or short videos contrasting Chinese and Western cultures based on the unit theme. This activates students' existing cognitive schemata and addresses the problem of monotonous preview materials that struggle to stimulate learning interest in conventional teaching.

In the scenario creation task, VR panoramic videos are utilized to present target cultural scenes, facilitating students' intuitive construction of new cultural schemata. Concurrently, an AI conversational agent simulates scenarios involving cultural misunderstandings, enabling students to interact with AI characters in real time. The AI provides immediate feedback and cultural norm prompts based on students' pragmatic performance, thus overcoming the limitations of traditional classrooms—namely, the absence of authentic communicative contexts and the difficulty in concretely experiencing cultural conflicts. In the language input task, an NLP corpus analysis tool automatically extracts authentic language samples from films, television programs, and news media, highlighting culturally loaded words. This addresses the issue that textbook language often diverges from real-world usage and fails to foreground cultural connotations. In the communication practice task, an intelligent speech evaluation system assesses not only pronunciation accuracy but also pragmatic appropriateness through NLP modeling, flagging culturally inappropriate expressions. This resolves the problem inherent in traditional oral exercises, which tend to prioritize linguistic form over communicative appropriateness and lack cultural feedback.

In the extended reading task, a personalized recommendation algorithm automatically pushes targeted cultural reading materials based on students' in-class performance data, addressing the problem that uniform assignments cannot meet individualized consolidation needs. In the asynchronous communication task, an AI-assisted writing tool provides real-time phrasing suggestions and cultural tips while students interact with cross-cultural pen pals, mitigating the issues of insufficient post-class communicative support and elevated communication anxiety. In the discussion and evaluation task, an intelligent learning report generation system integrates data across the entire learning cycle and produces a visualized four-dimensional competency radar chart. This addresses the limitation of traditional evaluation methods, which are often fail to comprehensively reflect the development of intercultural communication competence.

4.2 Welch's *t*-test

The standard t-test is used when the variances of two populations are unknown but equal. When the sample sizes and variances of the two populations are unequal, Welch's t-test can be used. Its test statistic is given by Equation (1):

$$t = \frac{X_A - X_B}{\sqrt{\frac{S_A^2}{N_A} + \frac{S_B^2}{N_B}}} \tag{1}$$

where X_A, X_B denote the sample means of sets A, B, respectively, S_A^2, S_B^2 are the sample variances of A, B, respectively, and N_A, N_B denote the sample sizes of A, B. In the Welch t-test, the null hypothesis and alternative hypothesis are given by Equation (2):

$$\begin{cases} H_0 : \mu_A = \mu_B \\ H_1 : \mu_A \neq \mu_B \end{cases} \tag{2}$$

Here, μ_A and μ_B denote the population means of sets A and B, respectively. The critical value C must be calculated based on the significance level α and degrees of

freedom v to determine the rejection region. Specifically, when $|t| \geq C$, reject H_0; otherwise, accept H_0. The degrees of freedom are calculated as shown in formula (3).

$$v = \frac{(\frac{S_A^2}{N_A} + \frac{S_B^2}{N_B})}{\frac{(\frac{S_A^2}{N_A})^2}{N_A - 1} + \frac{(\frac{S_B^2}{N_B})^2}{N_B - 1}} \tag{3}$$

5 An Experiment on Cultivating Cross-Cultural Communication Skills with AI Assistance

This chapter designates Class A as the experimental group and Class B as the control group. The experimental group implements the cross-cultural communication teaching model proposed in this paper with AI assistance, while the control group employs traditional teaching methods. Pre- and post-experiment performance data are collected via questionnaires to compare outcomes between the two groups. This analysis evaluates the effectiveness of AI technology and the proposed training model in cultivating cross-cultural communication skills among college students.

5.1 Application Evaluation of AI-Assisted Cross-Cultural Communication Competence

To verify whether AI-assisted learning can effectively enhance college students' English intercultural communication skills, an assessment scale was developed across four dimensions: (D1) Knowledge, (D2) Attitude, (D3) Emotion, and (D4) Behavior. Pre- and post-tests were administered to evaluate, organize, and analyze the intercultural communication abilities of two classes, with each dimension scored on a 5-point scale.

5.1.1 Pre-experiment Data Analysis

Table 5 presents the pre-experiment comparison of differences between the experimental and control groups across four dimensions. Table 6 shows the results of the independent samples t-test for the ability assessment scale between the two groups prior to the experiment. Before the experiment, the mean scores for both classes across the four dimensions clustered within the range of (2.7, 2.9), while standard deviations concentrated between (0.2, 0.4). In the t-tests for equal means: (D1) Knowledge Dimension: T=0.661, P=0.504>0.05. This indicates no significant difference between the two classes' data, meaning their levels of intercultural communication knowledge were nearly equivalent. (D2) For the attitude dimension, T = -1.541, P = 0.132 > 0.05, indicating no significant difference; the cross-cultural communication attitudes of the two classes were not markedly different. (D3) For the affective dimension, T = -1.031, P = 0.317 > 0.05, showing no significant difference; the affective levels of cross-cultural communication were equal between the two classes. (D4) In the behavioral dimension, T = -0.841, P = 0.411 > 0.05. The cross-cultural communication behavior levels of both classes were at the same level. Overall, prior to the experiment, there were no significant differences in the English cross-cultural communication abilities of the experimental and control groups in terms of knowledge, attitude, emotion, and behavior; they were at the same level.

Table 5: The differences in the four dimensions before the experiment

	Group	Average value	Standard deviation	Average standard error
D1	Class A	2.835	0.2725	0.0289
	Class B	2.817	0.2221	0.0338
D2	Class A	2.741	0.3744	0.0116
	Class B	2.753	0.2546	0.0476
D3	Class A	2.809	0.3792	0.0405
	Class B	2.837	0.2407	0.0156
D4	Class A	2.796	0.3648	0.0254
	Class B	2.845	0.341	0.0344

Table 6: The independent sample t-test results before the experiment

		F	Sig.	T	*df*	Sig. (Two-tailed)	Mean difference	Standard error
D1	Assuming equal variance	2.573	0.113	0.661	110	0.504	0.3179	0.04956
	Equal variance is not assumed			0.658	99.036	0.507	0.3179	0.4978
D2	Assuming equal variance	0.000	0.987	-1.541	110	0.132	-0.09248	0.06123
	Equal variance is not assumed			-1.527	106.023	0.136	-0.09248	0.06134
D3	Assuming equal variance	1.531	0.218	-1.031	110	0.317	-0.06923	0.06689
	Equal variance is not assumed			-1.033	103.012	0.319	-0.06923	0.06725
D4	Assuming equal variance	0.132	0.717	-0.841	110	0.411	-0.4712	0.05587
	Equal variance is not assumed			-0.842	105.893	0.425	-0.4712	0.05576

5.1.2 Post-Experiment Data Analysis

The comparative differences between the experimental and control groups across four dimensions post-experiment are presented in Table 7. Preliminary findings indicate that AI-assisted technology exerts a certain influence on students' English cross-cultural communication abilities. The test subjects in the experimental group scored an average of 3.400 and above in all the four dimensions which is a great improvement over the pre-experiment averages. Conversely, the average scores in the control group lay in the (2.6, 2.9) range. These scores were not only significantly below those of the experimental group but also more dispersed than the performance level of the control group before the experiment.

Table 7: The differences in the four dimensions after the experiment

	Group	Average value	Standard deviation	Average standard error
D1	Class A	3.7169	0.4377	0.047
	Class B	2.7151	0.43847	0.04602
D2	Class A	3.6376	0.3933	0.0409
	Class B	2.8623	0.33219	0.03169
D3	Class A	3.4603	0.4933	0.05463
	Class B	2.5642	0.43245	0.04521
D4	Class A	3.498	0.43137	0.04613
	Class B	2.6369	0.40301	0.04124

The results of the independent samples t-test comparing the experimental and control groups on the ability assessment scale after the experiment are shown in Table 8. Given the same mean values, the t-values of the two classes in the four dimensions, i.e., (D1) Knowledge, (D2) Attitude, (D3) Emotion and (D4) Behaviors were 1.603, 0.147, 1.012 and 0.163 respectively. At P=0.000 <0.05 all dimensions showed significant differences. With the support of AI technology, the students in the experimental group were successful in obtaining holistic and significant improvement in their English intercultural communication competence compared to those of the control group using traditional teaching. This confirms that AI technology can be used feasibly and reasonably to raise the level of English intercultural communication competence.

Table 8: The independent sample t-test results after the experiment

		F	Sig.	T	*df*	Sig. (Two-tailed)	Mean difference	Standard error
D1	Assuming equal variance	1.603	0.209	15.023	110	0.000	1.19352	0.08145
	Equal variance is not assumed			15.023	99.036	0.000	1.19352	0.08594
D2	Assuming equal variance	0.147	0.685	15.987	110	0.000	1.08431	0.07041
	Equal variance is not assumed			15.884	106.023	0.000	1.08431	0.07013
D3	Assuming equal variance	1.012	0.326	11.389	110	0.000	0.98413	0.08541
	Equal variance is not assumed			11.336	103.012	0.000	0.98413	0.08506
D4	Assuming equal variance	0.163	0.708	12.178	110	0.000	0.95874	0.07964
	Equal variance is not assumed			12.181	105.893	0.000	0.95874	0.07719

5.2 Overall Situation of Cross-Cultural Communication Attitudes

The attitude towards cross-cultural communication in terms of English is the basis of developing cross-cultural communication competence and can be viewed as a vital influencing element in terms of its formation. To find out if there were any significant differences in the intercultural communication attitudes between the experimental group and the control group before the experiment, and to find out if the suggested cultivation model

would have a positive and effective impact on students attitude to intercultural communication, this paper has used a questionnaire survey to test the attitudes to intercultural communication of each of these groups. The questionnaire scored out of 60, and a pass score of the questionnaire was 36, and it was given to students before and after the experiment. The following are presented one by one in this section: the statistics in relation to the cross-cultural attitudes among the experimental and control group students before the experiment; the statistics in relation to the cross-cultural attitudes among the experimental and control group students after the experiment; and an independent samples t-test in relation to the post-experiment cross-cultural attitudes between the experimental and control groups.

Figure 3 shows the pre-experiment cross-cultural attitudes of the experimental and control groups. The experimental group's average score was 30.09 (below 36), while the control group's average score was 31.20 (below 36), with a difference of only 1.11 points. This indicates that the cross-cultural attitudes of both groups were broadly similar and generally negative prior to the experiment.

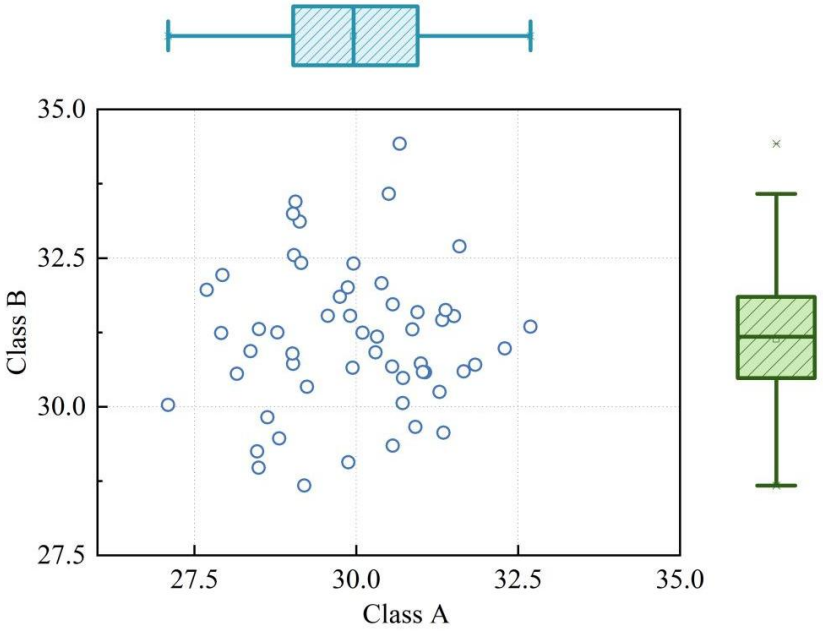

Figure 3: Cross-cultural attitude performance before the experiment

Figure 4 illustrates the cross-cultural communication attitudes of students in the experimental and control groups post-experiment. Table 9 presents the results of an independent samples t-test conducted on the post-experiment cross-cultural communication attitude questionnaire. Regarding the distribution of cross-cultural communication attitude scores post-experiment, students in the experimental group (37.5–42.5) not only scored significantly higher than those in the control group (30.0–37.5) but also exhibited a more concentrated score distribution. Table 9 indicates that the mean scores for intercultural communication attitudes between the experimental and control groups differed by as much as 6.02 points post-experiment, with a significance level of 0.941 > 0.05. This demonstrates that the scores for intercultural communication attitudes in both classes exhibited homogeneity of variance post-experiment, meeting the requirements for normality testing. $P<0.05$, with the 95% confidence interval for the difference not containing zero, further confirms that significant differences exist in the English intercultural communication attitudes of the two classes under different teaching models. Under the training model designed in this study, the experimental group not only outperformed the control group in intercultural communication attitude scores

but also demonstrated a significant improvement of over 5 points compared to their pre-experiment levels. This outcome validates the effectiveness of artificial intelligence technology in enhancing English intercultural communication attitudes.

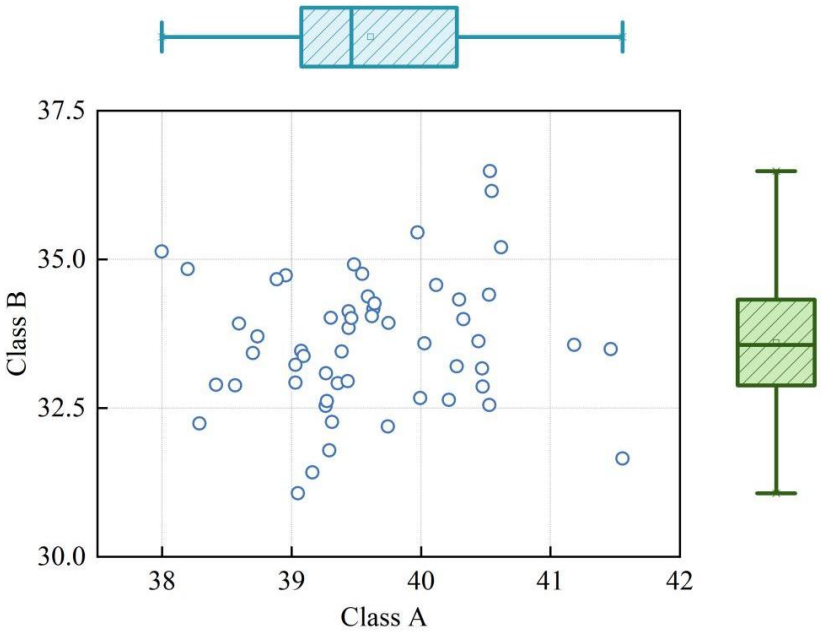

Figure 4: Cross-cultural attitude performance after the experiment

Table 9: Independent sample t-test for cross-cultural attitude performance

		Assuming equal variance	Equal variance is not assumed
Levin's equivalence test of variance	F	0.002	
	Sig.	0.941	
Mean equivalence t-test	t	3.532	3.532
	Degree of freedom	55	55
	Sig. (Bilateral)	<0.001	<0.001
	Average value difference	6.02	6.02
	Standard error difference	1.502	1.502
	The 95% lower limit of the difference	2.186	2.186
	The upper limit of the confidence interval	7.984	7.984

6 Conclusion

This paper integrates cultural schema theory to construct a “3-stage, 3-type, 9-task” classroom model for cultivating intercultural communication competence in college English education. By leveraging artificial intelligence technology to empower education, this model effectively enhances teaching outcomes in intercultural communication and promotes the refinement of cultivation mechanisms for such competencies. In practical application, this cultivation model comprehensively enhances students' intercultural communication competencies. Post-experiment, students demonstrated significantly superior performance across all four

dimensions—knowledge, attitude, affect, and behavior—compared to pre-experiment levels (P=0.000). Moreover, in cultivating attitudes toward intercultural communication, it demonstrated far superior effectiveness compared to traditional teaching models. Post-experiment, the average score difference in intercultural communication attitudes between the experimental group and the control group reached 6.02 points, with a significance level of 0.941 > 0.05. However, limitations include the small sample size (N=110) and the four-month intervention period, which may not capture long-term retention effects. Additionally, the study was conducted at a single institution. Future research should employ larger, multi-site samples and longitudinal designs to examine the durability of AI-assisted interventions. Further investigation is also needed to isolate the specific effects of individual AI tools and to explore their applicability across diverse educational contexts and learner populations.

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