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Model-based learning towards environment in cross-cultural communication: a mediating role of technology innovation acceptance in culture congruence and English language teaching for environmental education

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ABSTRACT

The effectiveness of English language teaching is a significant issue, especially in countries where English is the second language, like China, and this aspect needs researchers' emphasis. Hence, this study deems to analyze the model-based learning toward a green environment and how it can impact green culture congruence and effective green culture adoption. It also examines the green culture congruence, and innovation technology acceptance role in the English language teaching for the environment, in the institutions of China. The study also examines the mediating impact of green culture congruence and effective green culture adoption among model-based learning towards the environment and English language teaching for environmental education. Also, it checks the mediating impact of innovation technology acceptance among green culture congruence and English language teaching for the environment in China. This article has used the primary data collected from students of English language institutions using survey questionnaires. The study has also employed the SPSS-AMOS to analyze the linkage among the variables. All hypotheses were significant to the designed framework. Further, this study will help guide the policymakers while making the policies related to improving English language teaching using model-based learning towards environment and technology innovation acceptance.

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1. Introduction

English has become a global language for communication and business dealings in developing countries over the past few decades. It's one of the core reasons that the world has become a global village, resulting in an exchange of culture through business and tourism. The developing countries approach developed countries with the aim of

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business exchange, jobs, and education. One of the common barriers developing countries face is language, as most developing countries do not use English or lack proficiency in it. Similar is the case with China (Munir & Nur, 2018). China is one of the fastest grown economies in the world. It is narrated as a manufacturing factory of the world. The companies in all countries around the globe approach China particularly for business due to different reasons like cheap labor, fast manufacturing, and desired quality. Subsequently, when the world approached China, the common barrier raised for both parties was language. The English language is one of the major problems in China. Although China is ensuring maximum efforts to get their people familiar with English language but since it is not their native language, there are a number of issues faced like 1- lack of students interest in English language learning is not their native language (Munir & Nur, 2018), 2- lack of English language teaching facilities particularly learning media, 3- lack of students focus and concentration on learning, 4- limited hours of teaching, 5- teaching a large number of students at a time which can result in ineffective learning (Syatriana & Sakkir, 2020), 6- curriculum designing, 7- lack of skilled English language teachers (Phetaree et al., 2020). However, at present English language is not only crucial for business transactions on a global scale but also so that Chinese people and students can step their foot in every different, innovative and new business ideas, anywhere in the world and be proficient not just in their dealings but also in conveying their thoughts and bringing forward their own inputs and perspectives in the global (English) language.

China is a country of 1.3 billion people having 56 ethnic groups. The language situation among Chinese people is complicated. The official language of instruction and the national language is Putonghua (commonly spoken Chinese), which is spoken by more than 70% of the people (S. Wang, 2020). The 55 ethnic minorities speak almost 80 languages, and multilingual education for minority children has been supported since 1949. It has become increasingly active in recent years since the people of China have seen fast economic development and a surge in international trade, technology, and green cultural interactions over the past few decades. Because of this, English proficiency and its use in raising environmental education awareness is a serious concern. On a national level, the government views English as a crucial tool for furthering the country's opening up, a priceless asset for implementing its modernization agenda, and a crucial pillar of global educational competition (Munir & Nur, 2018). Whereas on the personal level, being proficient in English is seen as a prerequisite for several opportunities, including the ability to enroll in and graduate from university, pursue further education abroad, avail the jobs in the public and private sectors, foreign-invested companies, or joint ventures, and qualify for promotion to higher professional ranks. As a result, speaking and writing in English has gained greater national, social, economic and environmental status. An outstanding commitment to the teaching and study of the language has been made by the government, educators, students, parents, and society at large in response to this continuously growing need for English (Ly et al., 2021; S. Wang, 2020). As a result, there has been a significant push to increase and enhance English language teaching in the official education system. Additionally, to meet the needs of those outside the formal education system to learn or improve their proficiency in English, evening universities,

English teaching centers, distance learning, radio/television English courses, on-line English programmers, course books for private study, English newspapers/magazines, and English Corners have sprouted up throughout the nation. English language teaching has unquestionably developed into a national industry in the Chinese people (X. Wang, 2020).

English language teaching in Chinese people is aptly referred to as ‘the most ambitious language-learning effort in history’ due to its enormous scope. As a result, English language teaching in China is faced with the potential for growth and very difficult obstacles. Three factors drive the focus on English language teaching at the secondary level. First, it has been in the vanguard of educational reforms because it has seen the greatest alterations and modifications since China was established in 1949. Second, English language teaching at the secondary level is crucial to raising the general level of English proficiency in the country since it aims to prepare students for the future formal or independent language study for environmental education (S. Wang, 2020).

Last but not least, compared to English language teaching at other levels, secondary English language teaching directly affects a more significant proportion of English language learners in the official education system. The importance of the English language in China can be witnessed in China’s English language training market size, and the Chinese English language training is given in Figure 1.

Several other factors affect English language teaching in China, like improving the teaching method by incorporating teaching-related innovations and creating the English language learning and teaching culture in a technological way. Since technology has influenced every field of life, similar is the case with teaching. The teaching methods help the students to understand the teaching material. Further, the learning method is also the key to understanding. In the past few decades, model-based learning emerged as one of the most effective tools in terms of learning (X. Wang, 2020). The research on model-based learning is new and linked with the other education fields, i.e., English teaching, methodology, education technology, and distance education. Model-based learning is ‘the mental model’s formation and development by learners’ (X. Wang, 2020). Mental models organize knowledge about how the parts of systems interact to generate dynamic phenomena, where they are most frequently utilized. The demands of a work that calls for integrating numerous facets and levels of a system or circumstance give rise to mental models (Fan, 2018). Keeping in view:

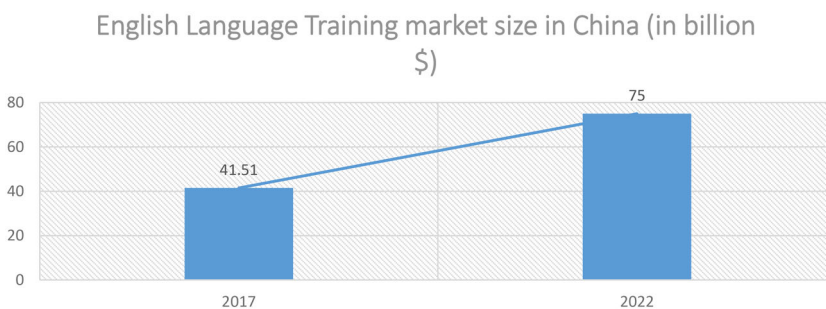


Figure 1. English language training market size in China.
Source: Author Construction.

the importance of model-based learning, the present study aimed to work on it. Nevertheless, the purpose of the study is to examine the role of Model-Based learning towards environment in Cross-Cultural Communication. Moreover, this study also aims to examine the mediating Role of Technology Innovation Acceptance in Culture Congruence and English Language Teaching for Environmental Education.

Likewise, in other studies, the significance of the present study is 1- Since China is the world factory, but its native language is Chinese, therefore the present study will highlight the importance of the English language for the countries like China, where it is not a native language but needed to learn with the view to facilitate the world, and 2- it will help the Chinese government as well as business, tourism, education related professional to revamp and implement their policies regarding English language teaching and learning with the view for easy and better communication with the world, 3- will also help the researchers to explore more aspects of English language learning and teaching in countries where it is not a native language.

The structure of the study is divided into different chapters; the first chapter will present the introduction, including the study gap and significance. In the study's second phase, the evidence about model-based learning, cultural congruence, effective cultural adoption, innovation acceptance, and English language teaching in connection with past studies will be discussed. The third chapter of the study will provide the details about the methodology, i.e., data collection about model-based learning, cultural congruence, effective cultural adoption, innovation acceptance and English language teaching, study nature, sampling technique, and population, and then the data validity will be analyzed. In the fourth chapter, the results of the study will be presented. The fifth chapter of the study will present the conclusion, implications, and future recommendations for scholars.

2. Literature review and hypothesis development

In every industry, the role of communication is emerging and polished from time to time. This has positively developed a sense of attaining information and inducing a competent role to the cultures. In the organization, the model-based learning is positive; that develops a platform for endorsing an idea and objective that has to be attained. In this context: Cisterna et al. (2019) discussed the inheritance and inducement of model-based learning and teaching significant for the cultural congruence. The role of model-based learning is dominant in culture congruence. The cultures in the organizations vary due to the communication and products; therefore, model-based learning removes gaps between them. Model-based learning provides a feasible environment for organizations to improve the relationship between the service provider and the clients. Further, Wang et al. (2017), investigated the cross-cultural skills and cultural congruence that is widely supervised by model-based learning. There are hierarchies to understand the models important to strengthen the cultural congruence. These hierarchies are based on the model-based learning critics that help to develop strong cultural congruence. Organizations need to improve the levels of communication between them and consumers. For this deemed need, the model-based learning induces prominent measures. These measures not only improve the

communication but also provides significant quality of care to the clients. Thus, the hypothesis derived from the above debate is as under:

H1: Model-based learning significantly influences cultural congruence

Model-based learning is the most important criticism to develop phenomena in organizational culture. It helps to form and develop the hierarchies and models that help the learner understand the communication and the dynamics of phenomena. Various integrations of model-based learning dynamically organize the information required to develop effective cultural adoption. In this context: Msaddek et al. (2021), narrated the elements of model-based learning and its potential for the digital elevation to effective cultural adoption. Model-based learning is established and introduced according to the demands and tasks of the organization. It also influences the effective adoption of cultures. The model-based learning is based on various learning processes that provide a significant cultural environment to the organizations. With the help of model-based learning, the organizations are able to cope with the cultural adoption that is a deem need of the organizations. Moreover, Goularte and Zilber (2019) investigated the role of model-based learning and cultural factors that provide a feasible environment for effective cultural adoption. Cultures in the organizations are adopted according to the levels of communication that are enabled by the model based learning. It is a learning system that organizes various steps to the organizations to effectively adopt the cultural needs. The productive phenomena is positive introduction toward the model based learning that clearly helps organizations in effective cultural adoption. Thus, the hypothesis derived from the above debate is as under:

H2: Model-based learning significantly influences effective green cultural adoption

Cultural congruence inserts a vital role for the positive development of cultures in the organizations. This role effectively removes the uncertainties between the providers and clients, which are an important asset to the organizations. Cultural congruence is based on the models and ideas of cultural competence that provides various platforms for the organizations. In this context: Lim et al. (2018) discussed the connecting corporate social responsibility initiatives that are developed according to the model-based learning attributions toward cultural congruence. Cultural competence is considered an ever-evolving measure between organizations and consumers. It also endorses a dominant impact on English language learning for environmental education that is a necessity for organizations and consumers. In most countries, there are language and cultural gaps, and different facilities have been established for this purpose. These facilities play a vital role in the positive introduction of cultural congruence that helps the environment and English language teaching and learning. Further, Turan and Akdag-Cimen (2020) analyzed the impact of cultural congruence that is necessary for communication uplift English language teaching to bring awareness for environmental education. Cultural congruence is based on various strategies that uplift the learning levels and strengthen the communication levels. These uncertainties exist due to cultural incompetence in some countries where the language barriers are usually high. Therefore, the positive endorsement of cultural congruence and

the barriers in English language teaching and learning must be furnished. Thus, the hypothesis derived from the above debate is as under:

H3: Cultural congruence significantly influences English language teaching for environmental education

Organizations and communities need to adopt measures that are not negatively associated with cultural needs. Mostly cultural needs are important to ensure a positive environment in the organization. Similarly, effective cultural adoption is highlighted worldwide due to the lack of English language teaching. In this context: Sun et al. (2020) narrated the impacts of cultural values and effective cultural adoption of technology adoption for English language teaching. More importantly, effective cultural adoption induces a prominent and dominant impact on English language teaching. The teaching of the English language is an important and primary aspect of the organization and people. In many parts of the world, there are numerous cultural gaps and a lack of English understanding. Therefore, the effective adoption of cultures denotes universal thinking and an environment that enables all feasible English language learning and teaching opportunities. Further, Rahman et al. (2019) explored outcomes and implications of English language teaching that are effectively upgraded by effective cultural adoption. Effective cultural adoption is associated with the environment of business and the existing need of the country. The people that are visiting the neighboring country lack information and language, and effective cultural adoption facilitates them. Effective cultural adoption also indicates that when the culture of another country is adopted, it helps in English language teaching. Thus, the hypothesis derived from the above debate is as under:

H4: Effective green cultural adoption significantly influences English language teaching for environmental education.

Some countries are less adapted to the cultures, and some are strictly adopted to the cultures that impact various changing situations. These changing situations comprise various impacts on the businesses and understanding of technology. Therefore, cultural congruence helps the organizations to obey the communication levels that strengthen the relationship between consumer and provider. In this context: Nimmo et al. (2021) analyzed the simulation of education and model-based learning implications toward the cultural congruence in students. When the organizations and communities are well associated with cultural congruence, it provides a feasible environment for innovation acceptance. The main hurdle between technological advancement and adaptability is the lack of cultural congruence. The strong communication between provider and client due to the cultural congruence helps to accept the innovation worldwide. Further, Taherdoost (2018) explored the models and necessities of technology acceptance according to cultural congruence. The interaction between the consumer and the service provider eliminates all the negative aspects and promotes innovative acceptance in their culture. It is dependent on the personal beliefs and moral values in cultural congruence that build a significant relationship between consumer and organization. Therefore, the primary narrative of cultural congruence is to avoid cultural bias that causes negative images of innovation and technology acceptance. Thus, the hypothesis derived from the above debate is as under:

H5: Cultural congruence significantly influences technology innovation acceptance

Many countries are less adapted to innovation and technology due to a lack of resources and interpersonal skills. The resources are the responsibility of governments, while interpersonal skills contain the effective communication between people. Innovation is the necessary element that is adopted all over the world due to broad positive elements benefiting the people. In this context: Costa et al. (2021) enumerated various determinants of innovation acceptance by the consumers that lead toward the English language teaching. Innovation in developing countries is less adopted due to lack of education and the information in people. This causes certain gaps between the provider and the client. Innovation acceptance provides various benefits to the people of the country and the organizations, especially to English language teaching. Mostly, the English language is considered the main barrier that is not fulfilled and disrupts business and communication. Innovation acceptance is positively associated with English language teaching and covers the quality of businesses. The acceptance of innovation in countries like China proceeds toward effective ways for other people in English language teaching and learning even though people need to ascertain. The importance of another language is helpful in businesses as well as understanding cultural importance. Thus, the hypothesis derived from the above debate is as under:

H6: Technology innovation acceptance significantly influences English language teaching for environmental education.

Proper organization of objectives and aims leads toward the road maps for people that strive to attain significant outcomes. Model-based learning is considered an effective way for the organizations to eliminate language barriers. In this context: Bayanova et al. (2022), assessed the levels and functions of cultural congruence that induce its role in English language teaching and model-based learning. The language barriers only occur when there is a difference in cultures and languages. Hosting countries entails many barriers like culture, language, facilities, and other proxies. The proper implementation of model-based learning covers these. Usually, model-based learning provides feasible steps for the countries and organizations to achieve the tasks in the proper way. Furthermore, Smith et al. (2020) explored the experience and instructions in the evaluative model-based learning in English language teaching. These proper ways are positively mediated by effective culture congruence. When there are hurdles between English language teaching and model-based learning, cultural congruence initiates effective ways to overcome the hurdles. Moreover, Rudolph, Yazan, and Rudolph et al. (2019) discussed the importance of cultural congruence, inserting a vital role in English language teaching through model-based learning. The universal cultures worldwide provide beneficial stances to the people who strive for English language teaching. The mediating effect of culture congruence maintains the effective relationship between the consumer and the provider that developed model based learning for the English language. Thus, the hypothesis derived from the above debate is as under:

H7: Culture congruence significantly mediates the relationship between model-based learning and English language teaching for environmental education.

The cultures are associated with the hierarchies developed by the organizations to meet the challenges in the businesses. Mostly, people visiting other countries face numerous problems, and the English language is considered a vital problem. Therefore, the proper development and organization of people visiting other countries could help them to overcome the issues. In this context: Siala et al. (2019) investigated the organizational learning and effective cultural adoption that inserts role in the model-based learning and language teaching. There is a variety of cultures all over the world, and effective cultural adoption helps people to develop proper hierarchies to attain the learning of these cultures. The elements of disrespect are also reduced with the effective cultural adoption that mediates between model-based learning and English language teaching. Further, Peel et al. (2019) analyzed the explanations and instructions with model-based learning, effectively boosting the levels of English language learning. When there is proper organization of learning in steps, designs, and organogram, the barriers in English language teaching could be eliminated. Usually, English language teaching is the main hurdle in countries with languages other than English. In furtherance, Thi Ngu et al. (2021), investigated the involvement of macroeconomic elements, mode-based learning techniques, and student levels toward the cultural adoption and English language teaching. Therefore, effective cultural adoption universally helps to develop significant platforms that are important in English language teaching. English language teaching has been vitally important for the entire world due to the universal communication in English. Thus, the hypothesis derived from the above debate is as under:

H8: Effective green cultural adoption significantly mediates the relationship between model-based learning and English language teaching for environmental education

Technology and innovation are considered primarily important for the entire world due to their use in businesses, organizations, and daily workings. Therefore, innovation must be adopted in the organizations to overcome the business issues. In this context: Min et al. (2019) discussed the need for innovation acceptance due to consumer information and knowledge that fulfills the cultural congruence and English language needs. Subsequently, innovation acceptance plays a vital role in the cultural congruence that influences English language teaching. The factors associated with English language teaching arise when there is a need for English, and some countries having other languages requires these platforms. Moreover, Wijnands and Gill (2020) explored the effectiveness of cultural congruence between English language teaching and innovation. These platforms are important to upgrade the business and communication levels between people and organizations. Moreover, Rudolph et al. (2019) investigated the critical assumptions in English language teaching with the innovation acceptance that is important for cultural congruence. The mediating role of innovation acceptance is vitally important to organizing people and organizations into groups. The organization of groups due to innovation acceptance overcome the issues in the cultural congruence and the English language teaching. Further, Mendoza-Tello et al. (2019), elaborated the disruptiveness in innovation due to consumer trust and acceptance that mediates among English language and cultural congruence. English language teaching is more important due to large business operations that requires effective cultural congruence. Therefore, the innovation acceptance

while mediating helps to maintain the cultural congruence that impacts English language teaching. Thus, the hypothesis derived from the above debate is as under:

H9: Technology innovation acceptance significantly mediates the relationship between cultural congruence and English language teaching for environmental education.

The present study will try to address some gaps, like 1- the language is a common problem for the cultural exchange. It's one of the issue which till now travelled with the evolution of mankind, being one of the important topic although researched although but still not reached its peak in case of China as there are number of its aspects are need to be explored, 2- Albiladi and Alshareef (2019), worked on the usage of blended learning in English teaching, whereas the present study will work on the usage of model based learning for English language teaching by employing tetra mediating effect from Chinese perspective with the fresh data set, 3- the model consists of model based learning, cultural congruence, effective cultural adoption, innovation acceptance and English language teaching is not tested before in China perspective with fresh data set in recent time, 4- Ly et al. (2021), worked on E-learning in online English language classes at tertiary level, whereas the present study will check the model based learning effect on English language teaching by employing triplicate mediation effect in China by selecting the fresh data set, 5- Ehsan et al. (2019), worked on cooperative learning in English teaching with the view to develop speaking skills ability, whereas the present study will work on model based learning and English language teaching in China where English is not native language and also check the culture and innovation effect as mediation, 6- Yusri et al. (2018), checked the effect of two stay two stray method for in English teaching with the view to increase student learning outcome, whereas the present study will check the model based learning effect on English language teaching in China with the addition of mediation effect of cultural congruence, effective cultural adoption and innovation acceptance by testing a fresh data sample.

3. Research methodology

The article analyzes the model-based learning impact on culture congruence and effective green culture adoption and also examines the role of culture congruence, effective green culture adoption, and technology innovation adoption in English language teaching for environmental education. The study also examines the mediating impact of culture congruence and effective green culture adoption among model-based learning and English language teaching for environmental education. Also, it checks the mediating impact of innovation adoption among culture congruence and English language teaching for environmental education in China. This article follows the survey research design and has used the primary data collected from students of English language institutions who were more concerned about the environment and wants to educate other people in their country about environment by using English language for communication. The article has taken the measurement scales for the variables from past studies. The measurement scale for model-based learning is adopted from Martinez-Lopez et al. (2017) and has four items scale. In addition, the measurement scale for culture congruence is adapted from Chen et al. (2021) and has three items scale. Moreover, the measurement scale for effective green culture

adoption is adapted and modified in a green perspective from Lam et al. (2021). Furthermore, the measurement scale for technology innovation adoption is adapted and modified from the technology and innovation perspective from Oduro (2020) and has five items scale. Finally, the measurement scale for English language teaching for environment education is adapted and modified in terms of environmental education from Vyatkina (2016) and has five items scale. These measurement scales are given in Table 1.

The students of English language institutions in China are the respondents of the study. The respondents have been chosen using simple random sampling. The

Table 1. Measurement scales for the variables.

Items	Statements	Sources
Model-Based Learning		
MBL1	"I try to take more thorough notes for my courses because notes are even more important for learning."	(Martinez-Lopez et al., 2017)
MBL2	"I read aloud instructional materials provided by institutions to fight against distractions."	
MBL3	"I prepare my questions before joining in the classroom and discussion."	
MBL4	"I work extra problems in my courses in addition to the assigned ones to master the course content."	
Culture Congruence		
CC1	"The teachers encourage attendance at training in cultural awareness."	(Chen et al., 2021)
CC2	"The teacher has an internal mission statement assessing a commitment to cultural awareness."	
CC3	"The airline understands my culture and uses ethnic-specific communication channels."	
Effective Green Culture Adoption		
ECA1	"The institutions' members are satisfied by the degree of collaboration towards environment."	(Lam et al., 2021)
ECA2	"There is a willingness to collaborate across institutions units within our institution."	
ECA3	"Our institution members have reciprocal faith in others' ability."	
ECA4	"Our institutions' employs have reciprocal faith in others' behaviors to work toward institutional goals towards environment."	
ECA5	"Our institution provides various formal training programs for the performance of duties towards environment."	
ECA6	"Our institution encourages people to attend seminars, symposia, regarding environment."	
Technology Innovation Adoption		
IA1	"My institution adopts innovation to improve our internal (R&D) and innovation process."	(Oduro, 2020)
IA2	"My institution uses the innovation model to gain expertise that we do not have internally."	
IA3	"My institution enterprise uses innovation to reduce the high cost of innovating alone."	
IA4	"My institution uses innovation to counterbalance our lack of capacity (e.g., infrastructures, facilities, and technologies)."	
IA5	"My institution uses the innovation to secure market share growth and global market reach."	
English Language Teaching for Environmental Education		
ELT1	"The teaching methods are easy to language learning for environmental education."	(Vyatkina, 2016)
ELT2	"I can use the material that is usually useful for learning the language for environmental purpose."	
ELT3	"Corpus work has been interesting."	
ELT4	"I like to do activities related to language learning to make use for environment related education."	
ELT5	"I like doing activities with paper corpus concordances for language learning."	

Source: Author Construction.

researchers have selected the top twenty English language institutions in China. According to the selected English language institutions, around 8500 students were currently studying. In addition, according to the Morgan criteria of sample size, the sample size of the given population is 368. Hence, the researchers distributed around 645 surveys to the respondents, but only 357 were received after two weeks. These surveys have received an approximately 55.35 percent response rate. The current article has used only one independent variable, such as model-based learning (MBL). In addition, the study has taken three mediating variables such as culture congruence (CC), effective culture adoption (ECA), and innovation adoption (IA). Finally, the article has used only one predictive variable named English language teaching (ELT). **Figure 2** given below shows these variables in the theoretical model.

The study has also employed the SPSS-AMOS to analyze linkage among the variables. This effective tool deals with large and small data sets effectively. In addition, it also has the feature of dealing with complex models. This tool deals with two models such as measurement and structural models. The measurement model deals with convergent validity, discriminant validity, and reliability. In contrast, the structural model deals with the association among the variables. The convergent validity has been checked using factor loadings, and the standard value of factor loadings should be more than 0.40. In addition, the convergent validity has also been checked using average variance extracted (AVE), and the standard value of AVE should be more than 0.50 (Purwanto et al., 2020). Furthermore, the convergent validity has also been checked using average Squared Shared Variance (ASV) and Maximum Shared Variance (MSV), and the standard value of ASV and MSV should be less than AVE. Moreover, the reliability has also been checked using composite reliability (CR), and the standard value of CR should be more than 0.70 (Purwanto et al., 2021).

In addition, the discriminant validity has been investigated using Fornell Larcker, and the standard value for the Fornell Larcker is that the first value in the column should be larger than the other values in the same column (Ringle et al., 2015). In addition, model good fitness has been examined with the help of root mean square error of approximation (RMSEA), comparative fit index (CFI), and Tucker-Lewis index (TLI), and the standard value of RMSEA should be lower than 0.05, while the standard value of TLI and CFI should be larger than 0.90 (Darwin & Umam, 2020). In contrast,

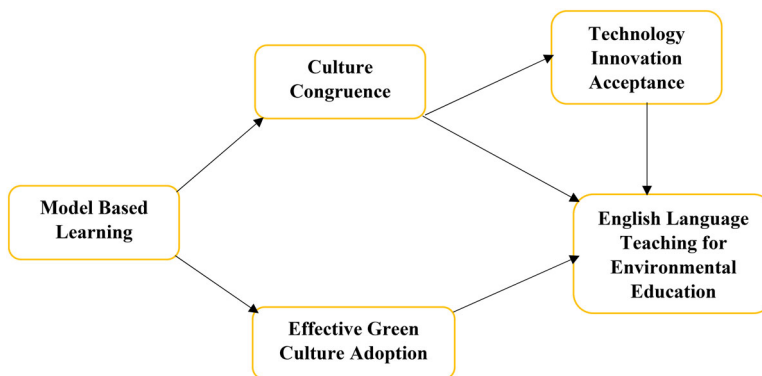


Figure 2. Research Model.
Source: Author Construction.

the association among variables has been examined with the help of t-statistics and probability values. The standard value of t-statistics should be larger than 1.64, while the standard value of probability value should be lower than 0.05. These tests are applied in the next section.

4. Research findings

The results show the convergent validity that exposed the association among items. The convergent validity has been checked using factor loadings, AVE, MSV, and ASV, and the standard value of factor loadings should be more than 0.40, while the standard value of AVE should be more than 0.50 and the standard value of ASV and MSV should be less than AVE. The results indicated that the factor loadings are more than 0.40, the results also indicated that the AVE is more than 0.50, and the results also revealed that the ASV and MSV values are lower than AVE. These results indicated valid convergent validity. Moreover, the reliability has also been checked using CR, and the standard value of CR should be more than 0.70. The results revealed that the CR values are higher than 0.70 and exposed valid reliability. Table 2 shows the convergent validity results.

In addition, the discriminant validity has been investigated using Fornell Larcker, and the standard value for the Fornell Larcker is that the first value in the column should be larger than the other values in the same column. The results revealed that the first value is higher than the rest and exposed valid discriminant validity. Table 3 shows the discriminant validity results.

In addition, model good fitness has been examined with the help of RMSEA, CFI, and TLI, and the standard value of RMSEA should be lower than 0.05, while the

Table 2. Convergent validity.

Constructs	Items	Loadings	CR	AVE	MSV	ASV
Culture Congruence	CC3	0.614	0.902	0.650	0.529	0.330
	CC2	0.857				
	CC1	1.020				
Technology Innovation Adoption	IA5	0.812	0.880	0.717	0.207	0.158
	IA4	0.923				
	IA3	0.976				
	IA2	0.811				
	IA1	0.866				
Model Based Learning	MBL4	0.974	0.945	0.774	0.529	0.229
	MBL3	0.992				
	MBL2	0.830				
	MBL1	0.874				
English Language Teaching for environment education	ELT5	0.740	0.835	0.522	0.480	0.277
	ELT4	0.840				
	ELT3	0.825				
	ELT2	0.861				
	ELT1	0.757				
	Effective Green Culture Adoption	ECA1				
ECA2		0.520				
ECA3		0.978				
ECA4		0.517				
ECA5		0.494				
ECA6		0.945				

Source: Author Estimations.

Table 3. Discriminant validity.

	ELT	CC	IA	ECA	MBL
ELT	0.806				
CC	0.455	0.847			
IA	0.727	0.364	0.880		
ECA	0.546	0.420	0.389	0.694	
MBL	0.536	0.339	0.325	0.693	0.920

Source: Author Estimations.

standard value of TLI and CFI should be larger than 0.90. The results exposed that the RMSEA value is less than 0.05, while TLI and CFI values are larger than 0.90, and the model is a good fit. Table 4 shows the model's good fitness results. (Figures 3 and 4)

Table 4. Model good fitness.

Selected indices	Result	Acceptable level of fit
TLI	0.904	TLI > 0.90
CFI	0.909	CFI > 0.90
RMSEA	0.007	RMSEA < 0.05 good; 0.05 to 0.10 acceptable

Source: Author Estimations.

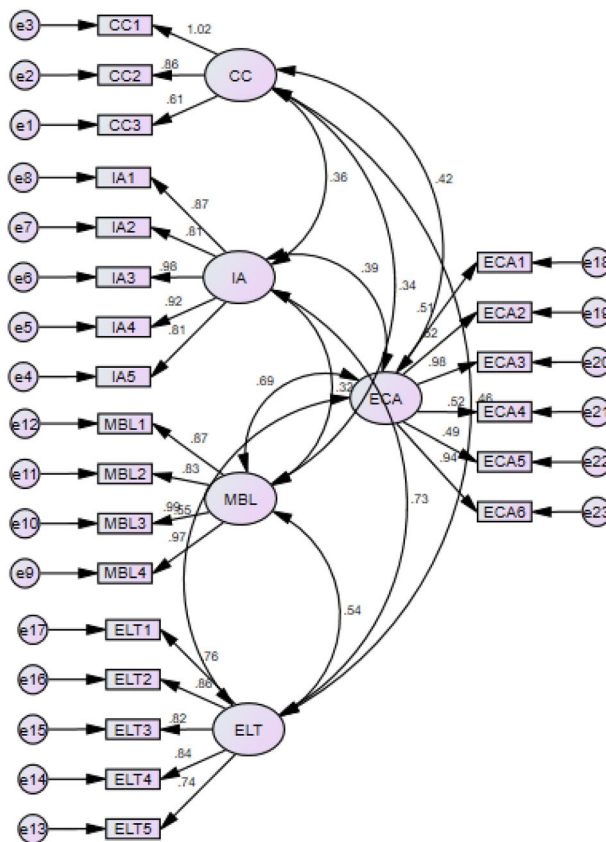


Figure 3. Measurement model assessment.

Source: Author Construction.

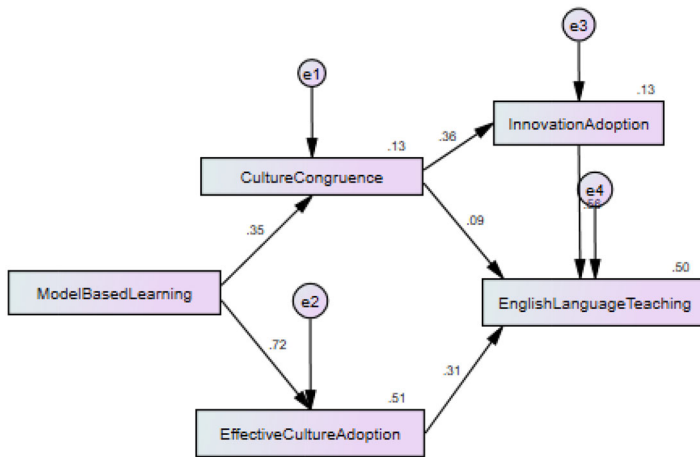


Figure 4. Structural model assessment.
Source: Author Construction.

The results indicated that model-based learning positively correlates with culture congruence and effective culture adoption and accept H1 and H2. The findings also exposed that culture congruence, effective green culture adoption, and technology innovation adoption are also positively linked with English language teaching for environment education and acceptance H3, H4, and H5. In addition, the findings also exposed that culture congruence has a positive linkage with innovation adoption and acceptance H6. Moreover, the findings also revealed that culture congruence and effective culture adoption partially mediate among model-based learning and English language teaching and accept H7 and H8. The results also exposed that adopting innovation partially mediates among culture congruence and English language teaching for environment education in China and accepts H9. These associations are mentioned in Table 5.

5. Discussion

The results showed that model-based learning has a positive link with cultural congruence. These results are supported by Meadows (2020), and when language is being taught or education is provided on any other subject, the effective teaching for environment education is dependent on the extent to which the tutors and learners share a green culture, at least during class. When the student is active and has made a specific learning model, whether it is bound to their mind or in the form of soft or hard copy,

Table 5. A path analysis.

Relationships	Std. Beta	Beta	S.E.	C.R.	p
CC ← MBL	0.354	0.302	0.042	7.135	***
ECA ← MBL	0.717	0.566	0.029	19.423	***
IA ← CC	0.363	0.349	0.048	7.346	***
ELT ← CC	0.089	0.072	0.033	2.152	0.031
ELT ← ECA	0.313	0.275	0.034	8.129	***
ELT ← IA	0.562	0.474	0.034	14.048	***

Source: Author Estimations.

they try to make better interaction with hyper-models (simulation, diagrams, explanation, instructions, data tables, or graphs) and phenomena (any form of experience and experiment) particularly which is beneficial for the environment. Thus, they may develop congruent culture. These results are also supported by Makhmudov (2020), which reveals that when, in an educational institution, the students are motivated and assisted in formulating some specific model about the environment to continue learning, they have a chance to learn about the green culture and develop cultural congruence.

The results indicated that cultural congruence positively links English language teaching for environmental education. These results are supported by Gashi (2021) which shows that the attraction and understanding between tutors and students are necessary to develop an effective learning environment for green technologies and the benefit towards reduction in pollution as in this environment, the tutors can better communicate their point of view to students, and in this way, they can better teach the subject. When there is cultural congruence between tutors and students, there is attraction and better understanding, which help the tutors to teach the English language effectively for environmental education. These results are also in line with Solgi and Tafazoli (2018), which shows that when, in an English language teaching class, the tutors and students have a common culture, they can teach the English language more effectively and minutely.

The results indicated that cultural congruence is a mediator between model-based learning and English language learning for environmental education. These results align with Rehman and Umar (2019), which examines the model-based learning role in English language learning. When students themselves have set a model in their mind to learn from the class, they pay attention to the simulation, diagrams, explanations, instructions, data tables, or graphs presented by tutors and familiarity. Hence, the cultures of students and teachers become congruent. When there is no obstruction of culture between teachers and students, the teachers can better guide and teach the students how they can better learn the English language. So, cultural congruence builds the link between model-based learning and English language learning for environmental education. These results are supported by Matsuda (2019), which highlights that when the students are motivated that they must form a learning model, they develop intimacy and cultural congruence. Cultural congruence improves the learning environment and helps to learn the English language.

The results showed that model-based learning positively links effective green cultural adoption. These results align with Zein et al. (2020), which focus on model-based learning for an education class. The students formulate a specific model of different steps to learn the subject. Under following the model, students must interact with their teachers and fellow students to have information, cooperation, and better understanding. So, they adopt an effective culture in the classroom. These results agree with Hussein et al. (2021), which highlights that the formulation or adoption of a specific learning model set in the students' minds keeps them active and makes them understand the necessity of effective green cultural adoption to follow the model. Hence, the students who have model-based learning adopt an influential culture in the classroom.

The results revealed that effective cultural adoption positively links to English language teaching. These results match with Matsuda (2018), which states that a teacher can achieve his teaching goals only when he succeeds in establishing a fruitful

interaction with the students and effective interaction & communication among students. When a teacher shows just, supportive, and cooperative behavior towards the students and arouses freedom of thought & expression in students, they can better teach the English language. These results are also in line with Galloway and Numajiri (2020), which explain that when an effective green culture is adopted, the students feel it easy to share their thinking, acquire questions, and remove confusion about the environment. In this situation, teachers can better teach the English language for environmental education with all its components like vocabulary, phonetics, semantics, syntax structure, grammar, and accent minutely.

The results indicated that effective green cultural adoption is a mediator between model-based learning and English language teaching for environmental education. These results align with Kim (2020), which highlights the effectiveness of English language teaching for environmental education. When the model-based learning method is adopted on the part of students, they have successfully developed the stamina to choose an effective culture within the classroom. When there is an effective culture in the classroom, teachers can form a context where they can teach English languages minutely and arouse confidence in students to speak English verbally. Hence, effective green culture adoption mediates between model-based learning and English language learning for environmental education. These results also align with Haidar and Fang (2019), which shows that model-based learning necessitates the interaction with fellow students and teachers, so it encourages adopting an effective green culture. An effective culture is useful for the teachers to complete the English language course and have positive results from students.

The results revealed that cultural congruence has a positive link with innovation acceptance. These results are supported by Jiang et al. (2020), which shows that innovation is something new and extraordinary that one has no experience of. For the adoption of innovation in a classroom, trust matters a lot. When both tutors and students share congruent cultures, they have the same beliefs and values and can have mutual trust. Having trust, the students get ready to adopt innovation in the learning environment. So, it becomes easy for the teachers to engage the students in innovative education processes. These results are also in line with Perez Canado (2018), which claims that when teachers have the same culture that the students follow, they can motivate the student to cooperate in implementing innovative teaching methods.

The results showed that technology innovation adoption has a positive link to English language learning. These results agree with Moate et al. (2021), which claims that many innovative technologies specific to education teaching technology, instructional technology, linear learning, behavioral technology, and instructional design technology can be useful for the teachers to teach the English language for environmental education to students effectively. These results are also supported by Corujo-Vélez et al. (2021), which examines the innovation adoption in educational institutions which provide language learning classes. With the adoption of technological innovation-based learning-teaching processes, the teachers can regulate the students, deliver lectures at any time, provide them with better knowledge, and can more effectively evaluate them. So, tutors can more effectively teach the English language to students.

The results indicated that innovation adoption is an appropriate mediator between cultural congruence and English language teaching. These results are in line with

Sasaki (2018), which shows that when teachers and students have congruent culture, there is trust and commitment among them, and thereby, it becomes easy for the teachers to implement innovative technologies and processes to teach the students. Thus, they can effectively teach English language learning. Hence, innovation adoption mediates between cultural congruence and English language teaching.

5.1. Implications

The current study has both theoretical and empirical implications. The study has great theoretical importance for its considerable contribution to the literature on the education of environment, green culture and technological innovation acceptance. The current study examines the role of cultural congruence and effective green cultural adoption in English language teaching. Cultural congruence and effective cultural adoption have usually been discussed as a culture simply to analyze their role in English language teaching. This study removes this gap through cultural congruence and effective green cultural adoption separately for English language teaching for environmental education. Though, in any form, the impacts of cultural congruence and effective cultural adoption on English language teaching have been analyzed. But these factors have not been used as mediators between model-based learning and English language teaching for environmental education. The present article contributes to the literature by analyzing cultural congruence and effective green cultural adoption as mediators between model-based learning and English language teaching. Moreover, the present study, which examines model-based learning, cultural congruence, effective cultural adoption, and innovation adoption in English language teaching in China, is a significant contribution to literature. The current study also has many empirical implications. It has great significance in almost all countries as it addresses the international language English and the ways how to teach the English language for environmental education. As English is considered the world language to communicate for social, cultural, economic, and political purposes, this study serves institutions that provide English language education or knowledge about any other language and the individuals who are interested in the second language English. The study guides the policymakers while making the policies related to improving English language teaching using model-based learning and innovation adoption. The study guides that institutions can improve English language teaching for environmental education with cultural congruence and effective green cultural adoption. If the model-based learning is implemented, cultural congruence and effective green cultural adoption can be ensured, leading to effective English language teaching for environmental education. The study also concludes that cultural congruence assists in adopting green innovation, which leads to effective teaching of the English language for environmental education.

6. Conclusions

The study aimed to examine the role of cultural congruence and effective green cultural adoption in English language teaching for environmental education. Its objective was also to analyze the cultural congruence and effective green cultural adoption role in the

middle of model-based learning and English language teaching for environmental education and to check the role of green innovation adoption between cultural congruence and English language teaching for environmental education. The quantitative information for the model-based learning, cultural congruence, effective green cultural adoption, innovation adoption, and English language teaching were acquired from China through questionnaires. The results showed a positive association between cultural congruence and effective cultural adoption of English language teaching. As a result, students can learn about the tutors' culture and create cultural congruence when they are encouraged and helped in developing a specific model for learning. The model-based learning approach keeps students engaged and helps them comprehend the importance of effective cultural adoption to follow the model. The results showed that cultural congruence and effective cultural adoption positively relate to English language teaching. When the tutors and students have a culture congruence, they can teach the English language more effectively and minutely. A teacher can efficiently teach the English language for environmental education, and the class adopts an influential green culture having values like justice, cooperation, respect, and freedom of thought & expression, for environmental friendliness. The results indicated that cultural congruence and effective cultural adoption are mediators between model-based learning and English language learning.

Moreover, the study showed that Teachers could encourage students to participate in using cutting-edge teaching techniques when they share the same culture as the pupils. By adopting innovation-based learning-teaching processes, teachers can better regulate teaching functions. So, tutors can more effectively teach the English language to students. Green Innovation adoption is an appropriate mediator between cultural congruence and English language teaching for environmental education.

7. Limitations

Though the current study has great implications, many limitations are still associated with the current study. The present study explores a limited number of factors such as model-based learning, cultural congruence, and effective cultural adoption as contributors to English language teaching effectiveness. There are many other factors like sources of learning, institutional support, and parental support matter in English language teaching effectiveness. For considering a limited number of factors for evaluating English language teaching, the current study is not comprehensive, and future authors are recommended to include more factors in the model for better English language teaching. The present study examines cultural congruence and effective cultural adoption as mediators between model-based learning and English language learning. The cultural congruence and effective cultural adoption affect model-based learning and English language learning and their relationship. So, it is recommended to explore the cultural congruence and effective cultural adoption as moderators between model-based learning and English language learning. In addition, the present study is based on the data from China for analyzing the role of model-based learning, cultural congruence, effective cultural adoption, and innovation adoption in English

language teaching. So, the study may not be valid in all countries. The future authors must examine these factors' nexus with the evidence from multiple economies.

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