IJOMER
(Indonesian Journal of Multidisciplinary Educational Research)
P-ISSN: 2987-7601 E-ISSN: 2987-0968
https://jurnalfaktarbiyah.iainkediri.ac.id/index.php/ijomer
DOI: https://doi.org/10.30762/ijomer.v4i2.9505

The effects of virtual culture simulations on EFL learners' intercultural sensitivity and willingness to communicate

***Hoang Minh Khanh[1]**
Department of English, Faculty of Foreign Languages, Thai Nguyen University, Vietnam
* Email: khanhhm.sfl@tnu.edu.vn

(*) Email Correspondent: khanhhm.sfl@tnu.edu.vn

Abstract

Intercultural sensitivity (IS) and willingness to communicate (WTC) are central to intercultural engagement, yet EFL classrooms offer limited opportunities for intercultural practice. This study compared virtual culture simulation (VCS) and textbook-based instruction in improving IS and WTC among Vietnamese undergraduates. Using a quantitative quasi-experimental, non-equivalent control-group pre-test–post-test design, 88 non-English majors from two intact classes were assigned by class to VCS (n = 44) or textbook instruction (n = 44). Across eight weeks, participants completed IS and WTC questionnaires before and after six weeks of instruction. VCS involved desktop-based 3D and interactive 360-degree simulations. Paired-samples t-tests assessed within-group changes, ANCOVAs compared baseline-adjusted post-test scores, and Pearson correlation examined experimental-group gain scores. Adjusted outcomes favored VCS for IS, $F(1, 85) = 48.72$, $p < .001$, partial $\eta^2 = .364$, and WTC, $F(1, 85) = 72.18$, $p < .001$, partial $\eta^2 = .459$. IS and WTC gains were positively correlated ($r = .684$, $p < .001$). Although findings support VCS as a supplement to textbook instruction, one class per condition limits causal interpretation. Teachers can integrate guided intercultural simulations into existing EFL curricula rather than replacing conventional language instruction altogether. Future studies should involve multiple classes, stronger allocation procedures, and delayed assessments.

Keywords: EFL pedagogy; intercultural sensitivity; quasi-experimental design; virtual culture simulations; willingness to communicate

Received:	13-07-2026	Revised:	07-10-2026	Accepted:	31-2026

Copyright: © 2022 Fakultas Tarbiyah, Institut Agama Islam Negeri Kediri. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution - ShareAlike 4.0 International License (CC BY SA) license (https://creativecommons.org/licenses/by-sa/4.0/).

INTRODUCTION

Globalization has reshaped English as a Foreign Language (EFL) education, positioning English not only as an academic subject but also as a tool for interaction across cultural and digital settings (Yazan, 2017). Linguistic competence alone may not ensure successful communication in multilingual environments (Salih & Omar, 2021). Learners who wish to participate in international study or work also need to interpret cultural expectations and manage communication across differences (Hashmi et al., 2025; Luu, 2026a; Xu, 2013). EFL pedagogy therefore increasingly considers Intercultural Communicative Competence (ICC) and Intercultural Awareness (ICA) alongside language skills.

An important affective dimension of this work is the relationship between intercultural sensitivity (IS) and willingness to communicate (WTC) in a second language. Intercultural sensitivity concerns how individuals respond to and make sense of cultural differences (Jedynak, 2021). The heuristic model of L2 communication suggests that confidence, affiliation, and other contextual factors may be related to situational anxiety and communication readiness (MacIntyre et al., 1998; Zheng et al., 2024). Openness to cultural differences may therefore be associated with greater willingness to engage in intercultural discourse, although this relationship should not be assumed to be direct or uniform across learners (Bhawuk & Brislin, 1992; Olson & Kroeger, 2001).

Conventional EFL classrooms may offer limited opportunities to practice intercultural interaction. In this study, the term virtual culture simulations (VCS) refers to desktop-based 3D simulations and interactive 360-degree video scenarios that provide structured opportunities to make communicative choices and reflect on cultural encounters. Prior work suggests that technology-supported environments can offer interactive learning opportunities, although their value depends on how activities are designed and used (Fathi et al., 2025; Wang et al., 2026). Structured VCS activities can allow learners to experience and reflect on cultural encounters, possible misunderstandings, and context-dependent interactions (Shih, 2015; Tajeddin & Ghaffaryan, 2020). These activities may help connect abstract cultural knowledge with situated communicative practice, but the extent of that transfer requires empirical examination.

A persistent instructional challenge in EFL education is that some learners hesitate when they encounter unfamiliar interlocutors or cultural expectations. Text-based instruction can provide factual knowledge about other cultures, but it may provide fewer opportunities to rehearse interaction or respond to intercultural misunderstandings (Luu, 2026c; Salih & Omar, 2021). Research on Vietnamese EFL learners has discussed hesitation associated with fear of negative evaluation and face concerns, suggesting the importance of supportive opportunities for practice (Luu, 2025; Luu, 2026b). Without experiential scaffolding, translating cultural knowledge into readiness to communicate may remain difficult for some learners (Luu, 2026b; Luu, 2026c).

An important gap remains in the empirical literature. Although previous research has examined intercultural sensitivity and second-language outcomes, fewer studies have measured changes in both IS and WTC within the same technology-supported intervention, particularly among Vietnamese undergraduate non-English majors. Much of the work cited above is based on cross-sectional surveys or descriptive accounts, which provide limited evidence about how these variables change from before to after an intervention (Luu, 2026a; Luu, 2026c; Wang et al., 2026). In addition, the evidence base gives limited detail about how learners describe their experiences during simulation-based intercultural tasks. The present study addresses these gaps by comparing pre-test and immediate post-test scores for IS and WTC in two intact classes and by using reflective journals and focus-group interviews to contextualize learners' reported experiences. Because the classes were not formed through individual random assignment and no later follow-up was conducted, the study evaluates immediate changes associated with the intervention rather than definitive causal effects or long-term retention.

The purpose of this study is to examine immediate pre-test to post-test changes associated with a six-week VCS intervention in undergraduate EFL learners' IS and WTC, and to assess the relationship between changes in the two self-reported measures. The study does not evaluate sustained effects beyond the immediate post-test. Specifically, it compares within-group change and adjusted post-test differences between the experimental and control classes, and explores the association between IS and WTC gain scores. The study addresses the following research questions:

1. Is there a significant difference in learners' Intercultural Sensitivity before and after participating in virtual culture simulations?

2. Is there a significant difference in learners' Willingness to Communicate (WTC) in English before and after the intervention?
3. What is the correlation between the improvement in intercultural sensitivity with the change in learners' WTC?

METHOD

Research Design

This study used a quantitative-dominant, quasi-experimental design with a non-equivalent control group and pre-test and immediate post-test measurements. Administrative constraints prevented individual random assignment, so two intact classrooms were used (Luu, 2026c). One class received the VCS-integrated English curriculum (experimental group), while the other followed a conventional textbook-based cultural discussion format (control group). Both groups completed the same measures at the start and end of the eight-week study period. This design permits comparison of observed change between groups, but pre-existing class differences cannot be ruled out.

$$\text{Experimental Group: } O_1 \rightarrow X \rightarrow O_2$$

$$\text{Control Group: } O_3 \rightarrow \cdot \rightarrow O_4$$

In this design, O_1 and O_3 denote the pre-test observations for the experimental and control groups, respectively. O_2 and O_4 denote their corresponding post-test observations, both administered in Week 8. X denotes the six-week VCS intervention provided to the experimental group but not to the control group.

Participants

The sample comprised 88 undergraduate non-English majors at a public university in Vietnam (Luu, 2025), with 44 students in each group. Convenience sampling was used to select two intact classrooms. The classes were designated as the experimental and control groups at the classroom level to minimize disruption to existing instruction; students were not individually randomized. All participants were Vietnamese L1 speakers with intermediate English proficiency based on institutional placement records. The manuscript reports no statistically significant baseline differences in English scores or initial affective measures. Because the classes were intact and selected by convenience, potential pre-existing class differences remain a limitation. The demographic distribution of the sample is summarized below.

Table 1. Participants' detail

Demographic Variable	Category	Experimental Group (n=44)	Control Group (n=44)	Total Sample (N=88)
Gender	Male	16	18	34
	Female	28	26	54
Age	19 years old	21	23	44
	20 years old	23	21	44
Academic Major	Business Administration	15	14	29
	Information Technology	17	16	33
	Food Technology	12	14	26
Prior Intercultural Contact	No prior international travel	44	44	88

Data Collection Instruments

The quantitative data were collected using the Intercultural Sensitivity Scale (ISS) developed by Chen and Starosta (2000) and an adapted version of the Willingness to Communicate (WTC) Scale originally established by McCroskey (1992). The 24-item ISS assesses five dimensions of intercultural communication: interaction engagement, respect for cultural differences, interaction confidence, interaction enjoyment, and interaction attentiveness. Items use a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). Before implementation, exploratory factor analysis (principal axis factoring with Promax rotation) was conducted to examine the factor structure in the Vietnamese EFL context. All retained items had reported factor loadings above 0.50. The dimension-level loadings and internal-consistency values are presented in the table below.

Table 2. Exploratory factor analysis

Dimension	Sample Items (24 Items Total)	EFA Loading Range	Cronbach's α
Interaction Engagement	I am open-minded to people from different cultures. / I try to obtain as much information as possible when interacting.	0.58 – 0.74	0.84
Respect for Cultural Differences	I think people from other cultures are narrow-minded. (Reversed) / I respect the values of people from different cultures.	0.61 – 0.79	0.81
Interaction Confidence	I always feel confident when interacting with people from different cultures. / I feel insecure when talking with foreigners. (Reversed)	0.55 – 0.82	0.85

Dimension	Sample Items (24 Items Total)	EFA Loading Range	Cronbach's α
Interaction Enjoyment	I get upset easily when interacting with people from different cultures. (Reversed) / I enjoy interacting with people from different cultures.	0.59 – 0.76	0.79
Interaction Attentiveness	I am very observant when interacting with people from different cultures. / I try to be sensitive to my interlocutor's feelings.	0.52 – 0.71	0.76

An adapted 12-item WTC scale was used to assess students' self-reported readiness to speak English across communication contexts and interlocutor types (McCroskey, 1992). Scores ranged from 0% (never) to 100% (always) and represented the reported likelihood of initiating speech in English (MacIntyre et al., 1998). Items covered public speaking, small-group discussions, and dyadic interactions involving acquaintances or strangers. The reported exploratory factor analysis supported a three-factor solution, and internal-consistency values for the subscales are shown in the table below.

Table 3. EFA and Cronbach Alpha

Situational Dimension	Sample Items (12 Items Total)	EFA Loading Range	Cronbach's α
Group Discussion WTC	Talk in a small group of acquaintances in English. / Start a conversation with a group of strangers in a seminar.	0.64 – 0.85	0.88
Dyadic Interaction WTC	Talk to an acquaintance while waiting in line. / Initiate an English conversation with a foreign stranger on the street.	0.71 – 0.89	0.89
Public Speaking WTC	Give a prepared speech in English before a large group. / Volunteer to answer a question in front of the whole class.	0.58 – 0.78	0.83

Intervention Procedure

The study lasted eight weeks within the regular semester. In Week 1, all 88 participants completed the ISS and WTC pre-tests. The active intervention then ran for six weeks, from Week 2 through Week 7. Both classes received the same number of instructional hours but followed different teaching approaches. The control group used a textbook-based cultural curriculum, reading passages about international customs, analyzing written dialogues, and answering comprehension questions. This approach did not include simulation-based interaction or immersive role-play.

The experimental class followed the same weekly topics but used VCS activities. Students worked with desktop-based 3D platforms and interactive 360-degree video scenarios, using avatars to navigate simulated cross-cultural settings (Shih, 2015). Activities required learners to make linguistic choices and respond to cultural misunderstandings or unexpected communication problems with pre-recorded English interlocutors. For example, a learner might need to clarify an interlocutor's intention or rephrase a message when an exchange appears to be misunderstood. This example illustrates the type of communicative response practiced, rather than a verbatim transcript of one recorded session. After each session, students wrote brief reflections on communication difficulties, language adjustments, and their reactions to the activity. In Week 8, both groups completed the same post-test questionnaires, and 15 students from the experimental group took part in semi-structured focus-group interviews.

Data Analysis

Quantitative analyses were conducted in IBM SPSS. Paired-samples t-tests examined pre-test to post-test changes within each group for IS and WTC. Separate analyses of covariance (ANCOVAs) compared post-test scores between groups while controlling for the corresponding pre-test score; group was the fixed factor and the pre-test score was the covariate. The results are reported with test statistics, degrees of freedom, p values, and partial η^2 where available. Because intact classes were used, the findings are interpreted as adjusted group differences associated with the intervention rather than definitive causal effects (Wang et al., 2026). To address the third research question, Pearson's correlation coefficient was calculated for the relationship between gain scores (post-test minus pre-test) in IS and WTC within the experimental group.

FINDINGS AND DISCUSSION

FINDINGS

Impact of Virtual Culture Simulations on Intercultural Sensitivity (RQ1)

For RQ1, the experimental group's mean IS score increased from 3.24 (SD = 0.41) at pre-test to 4.12 (SD = 0.35) at post-test, a gain of 0.88 points; the paired-samples t-test was significant, $t(43) = -11.42$, $p < .001$. The control group changed from 3.21 (SD = 0.38) to 3.26 (SD = 0.39), which was not statistically significant, $t(43) = -0.85$, $p = .398$. After adjustment for pre-test scores, the between-group difference in post-test IS was statistically significant, $F(1, 85) = 48.72$, $p < .001$, partial $\eta^2 = .364$. These results indicate a larger immediate increase in self-

reported IS in the VCS group; the quasi-experimental design does not establish a definitive causal effect.

Table 5. Pre-test and post-test findings on impact of virtual culture simulations on intercultural sensitivity

Group	Phase	Mean	SD	Paired t-test (df = 43)	ANCOVA F (df = 1, 85)	Partial η^2
Experimental (n = 44)	Pre-test	3.24	0.41	-11.42; p < .001	48.72; p < .001	0.364
	Post-test	4.12	0.35			
Control (n = 44)	Pre-test	3.21	0.38	-0.85; p = .398		
	Post-test	3.26	0.39			

Impact of Virtual Culture Simulations on Willingness to Communicate (RQ2)

For RQ2, the experimental group's mean WTC score increased from 51.45% (SD = 11.20) to 70.82% (SD = 9.15), a gain of 19.37 percentage points; this change was statistically significant, t(43) = -14.63, p < .001. The control group changed from 52.10% (SD = 10.85) to 52.75% (SD = 10.12), which was not statistically significant, t(43) = -0.52, p = .605. After adjustment for pre-test scores, the between-group difference in post-test WTC was statistically significant, F(1, 85) = 72.18, p < .001, partial η^2 = .459. These results show a larger immediate increase in self-reported WTC in the VCS group, but do not by themselves demonstrate that learners' communication anxiety decreased or that the changes transferred to real-world interaction.

Table 6. Pre-test and post-test findings on impact of virtual culture simulations on willingness to communicate

Group	Phase	Mean (%)	SD (%)	Paired t-test (df = 43)	ANCOVA F (df = 1, 85)	Partial η^2
Experimental (n = 44)	Pre-test	51.45	11.20	-14.63; p < .001	72.18; p < .001	0.459
	Post-test	70.82	9.15			
Control (n = 44)	Pre-test	52.10	10.85	-0.52; p = .605		
	Post-test	52.75	10.12			

Correlation Between Intercultural Sensitivity and Willingness to Communicate (RQ3)

For RQ3, gain scores in IS and WTC were positively correlated within the experimental group, r = .684, p < .001. Thus, participants who reported larger gains in IS also tended to report larger gains in WTC. This association does not establish that increases in IS caused increases in WTC, nor does it directly

measure communication anxiety. Because both measures were self-reported, the relationship should be interpreted as an association between reported changes.

DISCUSSION

The results show that the VCS group reported larger immediate gains in IS than the textbook-based control group. This pattern is consistent with the view that interactive, experiential activities can give learners opportunities to reflect on cultural differences while making communication choices (Kolb, 1984; Fathi et al., 2025; Luu, 2026c). The use of avatars, 3D environments, and 360-degree scenarios may have prompted learners to attend more actively to the context of an exchange than text-only activities did. However, because the outcomes were measured through self-report and the study used intact classes, the findings should be interpreted as evidence of an association between participation in VCS and immediate changes in reported IS, rather than definitive proof that the simulations caused the changes.

The experimental group also reported a larger immediate increase in WTC. This pattern is compatible with the L2 communication model, which emphasizes the relevance of confidence and affiliation to communication readiness (MacIntyre et al., 1998). The low-stakes practice available in VCS activities may have helped some learners rehearse responses to misunderstandings, request clarification, or rephrase messages. The positive correlation between IS and WTC gain scores ($r = .684$, $p < .001$) indicates that the two reported changes co-occurred in this sample. It does not show that higher IS directly reduced communication anxiety, because anxiety was not measured as a separate outcome and the correlation is not a causal test. The findings therefore support a cautious interpretation: repeated simulation-based practice may be a useful opportunity for learners to explore intercultural communication, but further studies using direct behavioral measures and stronger assignment procedures are needed.

For EFL teaching in higher education, the findings suggest that VCS activities may complement rather than replace text-based cultural instruction. Teachers could use 3D scenarios or 360-degree videos to create structured opportunities to practice clarification, rephrasing, and perspective-taking, followed by guided reflection. The scenarios should be designed to encourage curiosity and reciprocal respect rather than to treat one cultural norm as universal. Any claim that these activities improve communication outside the

simulated setting should be tested directly rather than assumed from self-reported questionnaire changes.

CONCLUSION

In this study, participation in a six-week VCS intervention was associated with larger immediate pre-test to post-test gains in self-reported IS and WTC than participation in textbook-based instruction. The gain scores for the two measures were positively correlated ($r = .684$, $p < .001$). These findings should be interpreted cautiously because the study used two convenience-sampled intact classes at one university and relied on self-reported questionnaires. The overall study lasted eight weeks, but no follow-up measurement was conducted; therefore, the retention or sustained impact of the changes remains unknown. Future research should include longer follow-up periods, more diverse samples and institutions, transparent reporting of class-allocation procedures, and direct observation or recording of communicative behavior to complement self-report measures.

ACKNOWLEDGEMENTS

Gratitude is extended to the research advisor for the invaluable guidance, insightful feedback, and continuous intellectual support provided throughout the execution of this study. Sincere appreciation is also expressed to the academic peer reviewers and proofreaders who assisted in refining the manuscript, as well as the administrative staff at the university for facilitating the institutional data collection process. Finally, special thanks are due to all the undergraduate students who participated in this research project, as their time, dedication, and cooperative engagement during the eight-week study period made the completion of this study possible. This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

REFERENCES

Bhawuk, D. P., & Brislin, R. (1992). The measurement of intercultural sensitivity using the concepts of individualism and collectivism. *International journal of intercultural relations*, *16*(4), 413-436. https://doi.org/10.1016/0147-1767(92)90031-O

Chen, G. M., & Starosta, W. J. (2000). The development and validation of the intercultural sensitivity scale. *Human Communication*, *3*, 1–15. https://digitalcommons.uri.edu/cgi/viewcontent.cgi?article=1035&context=com_facpubs

Fathi, J., Zou, D., & Zhaleh, K. (2025). Promoting intercultural communicative competence and willingness to communicate in EFL learners through virtual reality: a mixed-methods examination. *Computer Assisted Language Learning*, 1–44. https://doi.org/10.1080/09588221.2025.2496827

Hashmi, Z., Ashraf, A., & Ahmed, S. (2025). Beyond the Classroom: Exploring the Motivational Impact of Globalization on EFL Learners. *Journal of Social Horizons*, 2(2), 64-73. https://doi.org/10.5281/zenodo.15616017

Jedynak, M. (2021). Intercultural sensitivity and adult learners' willingness to communicate in english as a foreign language. *Anglica Wratislaviensia*, *59*(1), 93-107. https://www.ceeol.com/search/article-detail?id=1158616

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice-Hall.

Lee Olson, C., & Kroeger, K. R. (2001). Global competency and intercultural sensitivity. *Journal of studies in international education*, *5*(2), 116-137. https://doi.org/10.1177/102831530152003

Luu, P. D. (2026). Challenges and strategies of intercultural willingness to communicate among English majors at a Vietnamese public university. TNU Journal of Science and Technology, 231(04), 422 – 429, doi: https://doi.org/10.34238/tnu-jst.13650

Luu, P. D. (2026a). YouTube Spoken Corpora in Pronunciation Instruction for Fostering Intercultural Willingness to Communicate. World Conference on Science, Innovation and Human Progress. Futurity Research Publishing. https://doi.org/10.5281/zenodo.21260676

Luu, P. D. (2026b). EFL students' Intercultural Willingness to Communicate through Intergenerational Storytelling. *Journal of Philology and Educational Sciences*, *5*(1), 23–45. https://doi.org/10.53898/jpes2026512

Luu, P. D. (2026c). Perceived effectiveness and identity development in gamified intercultural learning among EFL learners. *TESOL and Technology Studies*, *7*(1), 1–15. https://doi.org/10.48185/tts.v7i1.2106

MacIntyre, P. D., Clément, R., Dörnyei, Z., & Noels, K. A. (1998). Conceptualizing willingness to communicate in a L2: A situational model of L2 confidence and affiliation. *The modern language journal*, *82*(4), 545-562. https://doi.org/10.1111/j.1540-4781.1998.tb05543.x

McCroskey, J. C. (1992). Reliability and validity of the willingness to communicate scale. *Communication Quarterly*, *40*(1), 16–25. https://doi.org/10.1080/01463379209369817

Salih, A. A., & Omar, L. I. (2021). Globalized English and users' intercultural awareness: Implications for internationalization of higher education. *Citizenship, Social and Economics Education*, *20*(3), 181-196. https://doi.org/10.1177/20471734211037660

Selvi, A. F., & Rudolph, N. (Eds.). (2017). *Conceptual shifts and contextualized practices in education for glocal interaction: Issues and implications*. Springer.

Shih, Y. C. (2015). A virtual walk through London: culture learning through a cultural immersion experience. *Computer Assisted Language Learning*, *28*(5), 407–428. https://doi.org/10.1080/09588221.2013.851703

Tajeddin, Z., & Ghaffaryan, S. (2020). Language Teachers' Intercultural Identity in the Critical Context of Cultural Globalization and Its Metaphoric Realization. *Journal of Intercultural Communication Research*, *49*(3), 263–281. https://doi.org/10.1080/17475759.2020.1754884

Wang, Y., Zhang, H., & Liu, D. (2026). The evolving impact of virtual reality-based cultural immersion: A longitudinal mixed-methods study on EFL learners' intercultural sensitivity, willingness to communicate, and L2 learning motivation. *Acta Psychologica*, *265*, Article 106631. https://doi.org/10.1016/j.actpsy.2026.106631

Xu, Z. (2013). Globalization, culture and ELT materials: A focus on China. *Multilingual Education*, *3*(1), 6. https://doi.org/10.1186/2191-5059-3-6

Zheng, H., Ding, P., Liu, Q., & Xing, L. (2024). Intercultural interaction willingness: a PLS-PM approach to influencing factors and its mediation effect. *Humanities and Social Sciences Communications*, *11*(1), Article 876. https://doi.org/10.1057/s41599-024-03396-5