



# What Efforts Have Teachers Made to Enhance Online Learning across Cultures in the Digital Age? A Synthesis Analysis based on Activity Theory Combined with Pedagogy

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## Abstract

*Diverse cultural backgrounds influence the interaction between instructors and learners in digitalized learning environments. Regarding information and communication technologies as artifacts, what efforts teachers have done to reduce the cultural barriers in digitalized or online learning environments are still under research. Due to the potential to analyze the interaction between different perspectives, Activity Theory was integrated into this article to systematically analyze what pedagogical variables have been considered in the cross-culture online courses. Findings were that no complete, cultural frameworks were considered in pedagogical strategies, computer-supported collaborative learning was dominant but different in the task design and the way of group discussion organization, learning management systems and social media were common teaching and communication tools, learning objectives and outcomes mainly included awareness of the cultural differences, communication skills, problem-solving skills. Meanwhile, teachers preferred qualitative assessment of the formative learning performances, the technical staff was considered as other important stakeholders, disciplines included communication skills development, foreign language learning, and product design courses in higher education. Suggestions are to enhance cross-culture ability training in teachers' professional development, develop related learning analytics tools to reduce cultural barriers and facilitate the high standards training of learning space designing skills for instructors and self-regulation skills for students.*

**Keywords:** cross-culture online learning, activity theories, pedagogies, learning analytics, computer-supported collaborative learning

## 1. Introduction

Compared to the agricultural and industrial ages, the internet age extends the scope of information spread. The process of globalization continues to stimulate exchanges between people from different cultural backgrounds to collaborate or cooperate in problem-solving and optimal solutions-seeking across the world. That is also true in education. Advances in information and communication technologies (ICTs) have the potential to integrate the strengths of students and teachers from different cultural backgrounds without a substantial increase in educational costs. However, limited by geographical boundaries, learners from different cultural backgrounds within one learning environment do not guarantee efficient conversations spontaneously. The ability of questions clarifying and crucial conversations to foster cross-cultural discussions needs to be trained [1], whether it regards students or teachers and whether in physical learning or virtual learning context.

## 2. Literature review and research questions

The widely mentioned cultural frameworks in education are Hofstede's cultural model, Hall's cultural classifications, Folwerdew and Miller's "Notion of Culture" framework. As Vatrappu and Suthers (2007) [2] mentioned, when online education can be serviced as an alternative to traditional schooling, how students perceive the social affordances of virtual learning institutions becomes significant. At the same time, a simple mix of participants from diverse cultures may not be enough to stimulate a critical awareness of cultural issues [3]. Facilitating efficient interaction within diverse cultural learning contexts is hard, especially in online or digitalized environments. Though some studies collected qualitative data about what instructional strategies instructors of online courses use to address issues related to cultural diversity from experienced instructors [4-7], the integrated movements between teachers, students, and tools in diverse cultural online learning contexts are still not clear. Few reviews figured out what pedagogical strategies have online instructors adapted to enhance efficient cross-



cultural online learning. Therefore, this study tries to present some clues about the questions as follows:

- (1) Which pedagogical strategies were common online across culture learning environments?
- (2) What learning effects have they produced?

### 3. Research methods

#### 3.1 Search strategies

This systematic review followed the PRISMA guidance in the search and selection flow chart [8]. Web of Science, Scopus, PubMed, and PubPsych were used as databases. The search keywords on the Boolean search string were: (cultur\*) AND (digital OR online) AND (learn\* OR teach\* OR educat\*). The inclusive and exclusive criteria could be found in Table 1. Peer-reviewed publications owned the priority in our search process. Initially, 15,596 references were produced. After abstract screening and deduplication, 105 related papers were left. After the full-text screening and snowballing related articles, 18 articles were reminded.

Table 1. Inclusive and exclusive criteria

Inclusive criteria	Exclusive criteria
From 2000 to 2021	Culture is used as a learning objective
Available and accessible in English	Cultural differences are just used as background description
Cultural differences are considered factors to influence the learning and teaching process	Simple questionnaires survey about attitudes of learners toward digitalized/online learning environments in different cultures
The experimental or quasi-experimental study is described	Using a cultural framework to analyze the characteristics of learners or teachers from one country or cultural group (culture was not considered in the teaching process) and find the relationship between those characteristics and learning outcomes
Digital or online learning environments	Without detailed information about learners, instructions, or learning outcomes

#### 3.2 Code scheme

Regarding the analysis framework, Activity theory (AT) was chosen for its potential to provide description guidance in a complex holistic system with specific objectives through digital tools [9]. To combine the concept of culture and pedagogies, this article refers to the definition of culture from Hofstede. As for the pedagogies, this study uses pedagogy-related questions and pedagogical strategies from studies of Ciavarelli (2003) [10] and AbuSneineh and Zairi (2010) [11] to assist the authors to organize code items. Considering this article focused on the pedagogical strategies from teachers' perspective, pedagogical, instructional, and teaching have been used alternately. This information about pedagogies has been analyzed within the framework of AT [12], as seen in Figure 1.

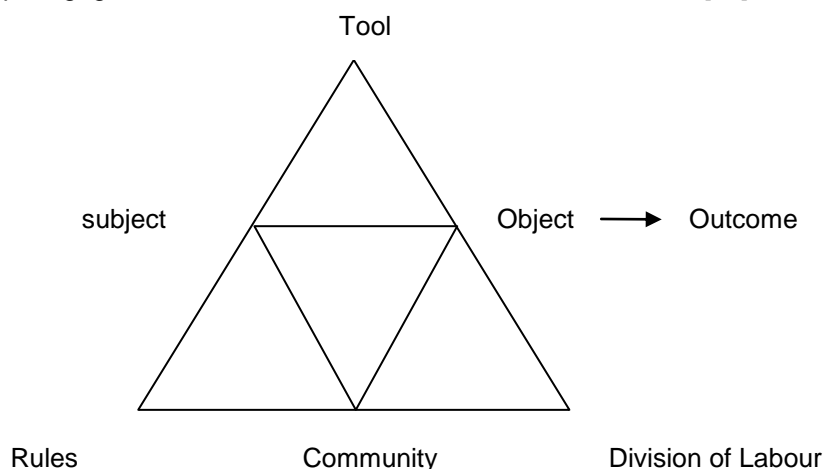


Figure 1. The structure of human activity [12].



#### 4. Results

The coding results showed the overall rules, communities, division of labour, object, and outcome trends in cross-culture online learning. The operational definitions of the seven factors from the AT in this review, descriptive analysis of the 18 selected papers, and detailed tables of the seven factors with related references could be found through the link: <https://github.com/wentingsunhu/What-Efforts-Have-Teachers-Made-to-Enhance-Online-Learning-across-Cultures-in-the-Digital-Age.git>

Table 2. Related stakeholders (Division of labour)

Sub-elements	Items
Teachers' office and institutional helpdesk	Technical support, Pedagogical assistance, and E-learning quality control from the teachers' office; Access problems support from the institutional helpdesk
Researchers contact students directly	Record student groups' operation and communication; Student group interviews

Table 3. Disciplines or projects (learning community)

Sub-elements	Items
Students	Business education course
	Foreign language learning course
	Communication course
	Product design course
	Digital literacies and consumption
Teacher	Pedagogy of writing instruction for teachers' course; Education

#### 4.1 Q1-Which pedagogical strategies were common online across culture learning environments?

Table 4. Pedagogical strategies (Rules)

Sub-elements	Items
Group discussions	Facilitator role of teachers in discussion board; Instructors debrief students frequently; Cultural diversity activities in school as learning materials; Virtual partner(s) group discussion about international current events; Collaborative Online International Learning; Cross-cultural management problems in corporate settings as learning materials
Project-based learning	Mixed multi-cultural project groups; Customer–merchant model; Different roles in collaboration (relationships with Sternberg's thinking styles inventory); Experiential and reflective learning
Problem-based learning	asynchronous online discussions in addition to submitting their assignments, either individually or in groups
Cultural consideration in feedback	Power distance considered in instruction; Online learning combined with culturally responsive teaching strategies
Digital game-based learning	Learning games designed based on cross-cultural psychology

#### 4.2 Q2-What learning effects have they produced?

Table 5. Learning objectives (Object)

Sub-elements	Items
Collaboration skills	Ability to have intercultural discussions and conversations
	Smooth communication and mutual understanding
	Cross-national systems building
	The need to internationalize the curriculum
	Collaboration in project-based learning



Language skills	Reading and writing skills in business English through discussion foreign language vocabulary acquisition
Cultural awareness	Stereotyping and misperceptions in organizational behavior the importance of diversity in education; Teachers' possibilities for implementing culturally appropriate writing practices To share different thinking and life experience
Intercultural competence	Components of intercultural competence can be understood and applied (for teachers)
Motivation	Learners' interests in cultural diversity; Foreign language learning motivation Technology-based education is included by Higher education officials
Problem-solving skills	Introduction and simple application of design methods

Table 6. Learning outcomes and learning measurement (Outcomes and Rules)

Sub-elements	Items
Learning performance	Motivation; Cross-cultural competence; Team cohesion; Skills at problem-solving; Teachers' skills at feedback-giving; Distance work skills; Social and interpersonal skills; Deep understanding of diversity in education; Different types of visualization forms in discussion; Self-awareness
Learning measurement	Discussion posts; Peer assessment and/or self-assessment; Reflective tasks; Pre-and post-assessment; Task presentation

## 5. Conclusions and further studies

Not every selected article presents all answers to the seven factors of AT, so this review integrated the coded results from the selected articles to demonstrate the general trends of pedagogical strategies used in cross-cultural online learning environments. In general, instead of following an existing cultural framework, teachers put more effort into the combination of real-time data about students learning behaviours and tried to analyse the learning progress and orient general learning objectives. It means a high-level requirement for the cross-culture ability of online teachers.

In theory, the interaction of online learning culture can be negotiated [13]. It not only needs the efforts of online instructors but also the efforts of online learners. Hofstede (1986) [14] pointed out that when the perplexing of diverse cultural learning situations is not ignored, two potential strategies which should be considered mixed in large or small group tutoring are to teach the teacher how to teach and to teach the learners how to learn. There are still some unclear research areas behind the cross-cultural online learning scenarios. For instance, whether online teachers have taught the differences in learning strategies between computer-supported collaborative learning environments and traditional face-to-face collaborative learning environments? Have online teachers been given some communication tips in cross-cultural learning groups? On the other hand, how to take advantage of communication technologies to improve the quality of cross-cultural online learning and whether it is possible to use learning analytic technologies to assist teaching and learning in cross-cultural online learning contexts also need further exploration.

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