

# Discovering the Relationships Between Uncertainty Utterances and Knowledge Building in Cross-culture Online Collaborative Learning

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**Abstract:** Previous studies focus on uncertainty expressions and how it is managed among basic and secondary education level students in a collaborative learning context. Although it has been reported that uncertainty serves as a motivation for learning, little is known about how it relates to knowledge building. In this paper is presented an essential aspect of the research area which focuses on uncertainty utterances and how they relate to knowledge building.

This study seeks to examine how graduate students communicate, negotiate their uncertainties during online collaborative discussion writing to build on their knowledge and determine the relationship between uncertainty utterance and knowledge building. Insights into the data collection and proposed method of analysis are discussed. and explanation from peers. The findings of this study will pave the way for future studies to investigate uncertainty in different geographical contexts and subjects or courses.

**Keywords:** Uncertainty utterance, Knowledge-building, Cross-cultural collaborative learning

## 1. Introduction

The internationalization of higher institutions in China, most universities have enrolled international students from different cultures, which makes the universities a multicultural environment. In China, some universities offer the English-taught programs which sometimes attract Chinese students. Some students come from countries where the English Language is not the native nor official language but have good English language proficiency. This increasing nature of multicultural environment requires critical attention by instructors (Parris & Linder-VanBerschoot, 2010). Students at the higher education level need to be trained for cross-cultural relations and communication skills. Collaborative learning (CL) promotes social interaction, learning and generating ideas among collaborators. Furthermore, through social interaction, individuals express uncertainty (Smithson 1989). By interacting with each other in a collaborative dialogue, students negotiate to tackle uncertainty (Lund, et al., 2019). However, there is no study of how uncertainty correlates with knowledge building, especially with culturally heterogeneous groups. Furthermore, existing cross-culture studies focus on promoting cross-culture knowledge and understanding, and students' perceptions. Concerning China, most cross-cultural collaborative studies focus on 2 country cultures such as China and Canada (Shi et al., 2013) or China and the US (Angelova & Zhao, 2014). Hence, significant to explore uncertainty in cross-culture collaborative learning and the significance of uncertainty expressions concerning knowledge building. To fill this research gap, this study aim to: 1) Identify how culturally diverse groups build on their knowledge amid uncertainty in an online learning environment, and 2) determine how uncertainty utterance relates to knowledge building among culturally heterogeneous groups.

## 2. Literature Review

### 2.1 Cultural Context and Uncertainty in Collaborative Learning

In this study, culture is defined by national culture, which is an individual's country culture, which according to Hofstede (1990), is the collective encoding of the mind, that can be used to distinguish people from different countries. Culture is densely related to language use and communication (Alvesson, 2004). Studies on cross-cultural collaborative learning reveal the benefits such as cross-cultural understanding and knowledge (Kersten & O'Brien, 2011), and challenges such as students preferring to collaborate with individuals from their country (Moore & Hampton, 2015; Kumi-Yeboah, 2018). Studies such as Baker et al. (2005) show that some students prefer same culture groups whereas others are positive towards studying with individuals from other countries. This is as a result of group members that are active and make collaborative discussions challenging (Fozer & Valet, 2012) and stimulate uncertainty. In diverse group discussions, there is uncertainty about social interaction, known as relational uncertainty and uncertainty about the content or topic of discussion known as epistemological uncertainty (Hartner-Tiefenthaler, Roetzer, Bottaro, & Peschl, 2018). Collaboration becomes challenging when there is uncertainty due to cultural differences. posit that the feelings of uncertainty play an imperative role in learning during collaborative learning (Jordan et al., 2012). Uncertainty when expressed in a collaborative activity, presents prospects for social interaction that is geared towards learning, through questioning, researching, inquiring, explaining, and generating solutions (Costache et al. (2019); Kapur & Bielaczyc, 2012). Social interaction is influenced by culture as individuals within themselves have different ways of thinking, behaving, and feelings (Vatrapu & Suthers, 2007), concerning learning (Setlock et al., 2004). Also, individuals from different cultural orientations have been found to either have a "high or low uncertainty avoidance", where the unknown becomes a threat to culture (Hofstede et al., 2010). In this study, we define uncertainty as to the experience, thought, or feeling of the unknown that results in a deviation from target goals.

## *2.2 Uncertainty and Knowledge Building in Cross-cultural Collaborative Learning*

Uncertainty is important for knowledge-building communities because, they embody and create knowledge, with causes and effects, and approaches to "epistemological indeterminacy" are solved directly (Murray, 2006). Pesaresi and Zhang (2019), define uncertainty as a strategy for idea generation and enhancement in knowledge-building discourse. According to Afifi and Afifi (2009), the experience of uncertainty is represented as a signal of ones understanding about something which affects input and decisions. Cross-culture online collaborative learning should promote idea generation, idea organization, and intellectual convergence to construct knowledge. Yet, when individuals face situations of unknown outcomes such as reactions to comments and ideas, uncertainty arises (Babrow, 2001), which can hinder knowledge building if not managed positively. However, as students interact more on the content, they explain to each other thereby processing more information (Zheng et al., 2015). Students may discuss or question deviating contributions which will help them negotiate to arrive at the right answer (Weinberger et al., 2005). According to Hartner-Tiefenthaler et al. (2018), uncertainty at the beginning of collaborative discussion is relational uncertainty, which when overcome by students incite engagement and epistemological uncertainty sets the pace for knowledge building. However, students need to express their uncertainties, which serve as a motivation for knowledge building (van Heigst et al., 2019). Also, there are instances that some students contribute less or tasks are ignored (Näykki et al., 2017), when they are uncertain about the content. Therefore, it is important to guide students and support them to view uncertainty as an opportunity to learn. Yet, there is a lack of studies on how uncertainty and knowledge building correlate. Therefore, this study will examine if there is a relationship between uncertainty utterances and knowledge building.

## *2.3 Research questions*

To explore uncertainty and knowledge building among diverse cultural groups, it is important to first determine how students communicate their uncertainty and the choice of words in the English language. Furthermore, the proposed study will examine how students from different cultural backgrounds students utilize uncertainty to build on their prior knowledge and determine whether there is a relationship between uncertainty expressions and knowledge-building during cross-culture collaborative learning. Therefore, the study seeks to answer the following research questions:

RQ1: a) How to identify uncertainty utterances in cross-culture collaborative knowledge building discussions? b) What is the students' choice of words for expressing their uncertainties in cross-culture collaborative learning?

RQ2: How do cross-cultural groups negotiate uncertainty to increase knowledge building?

RQ3: Is there a relationship between uncertainty utterances and knowledge building in cross-culture collaborative learning?

### **3. Proposed Methodology**

#### *3.1 Participants*

Participants in this study will comprise graduate students from different countries including China in Beijing Normal University. The proposed sample size is 120 students from both collectivist and individualistic cultural orientations. Prospective participants will be graduate students in groups of 4 who can read and write in English language for discussion and have prior knowledge in Introduction to Information Communication Technology (ICT) from their undergraduate studies will be eligible.

#### *3.2 Proposed research procedure*

For this study, a carefully designed collaborative script to support cultural differences and expected reactions will be employed to minimize the effects of different cultural backgrounds on students' engagement during collaborative learning. The collaborative learning task design will be based on a textbook on Introduction to ICT on the topic Data Storage and Protection. The task will be a problem case for students to discuss and solve. All the discussions will be online and students will be required to discuss by text. All groups will be given the same collaborative task. The final group product will require students to generate a solution for a problem scenario. Hofstede's (1997) individualism index for cultural orientation will be used to guide the group formation process. Each group will comprise 2 students from individualist cultural orientation and 2 students from collectivist cultural orientation. The entire study will take 4 hours and 30 minutes, spread in 2 days. For day 1, an orientation will be conducted for participants and group members will be asked to introduce and get familiar with each other in 30 minutes. Day 2 will be for the main collaborative activity, which will last for 4 hours. Finally, this study will exempt face-to-face discussion and hence, all discussions will be in an online learning environment.

#### *3.4 Data collection and analysis*

The main data to be collected will be the English language text from students' online discussion. Students' discussion will be downloaded and stored for analysis. To answer the first research question, the quantitative content analysis method will be employed (Hara, Bonk, & Angeli, 2000). The words sample will be coded and counted for each group under each category of expression. Two experts will be invited to assist with the coding for inter-rater reliability. The strategies cross-cultural groups adopt to overcome their uncertainties will be identified. To determine whether uncertainty expressions can be related to knowledge building, first, the IIS-Map-Based analysis tool by Zheng et al. (2012) will be applied to first draw a target knowledge map, then input knowledge sentences in the tool to automatically calculate knowledge activation quantity for each group. With the IIS-Map-Based method of analysis, each sentence will be segmented in this order: Time, Information processing learner (IPL<sub>i</sub>), Cognition level, Information type, Representation format, and Knowledge sub-map. After, correlation analysis will be performed on the sum of uncertainty utterances and knowledge activation quantity for each group with the IBM SPSS 26.0 version. Thus, to determine if there is a relationship between the number of uncertainty utterances and knowledge building process.

#### 4. Proposed contribution

The proposed study has its significance and contributions to the research area as it aims to draw out significant aspects of uncertainty and students' cultural orientation in collaborative learning among culturally heterogeneous groups. The study will contribute to the research area as it will throw light on how practitioners can identify how students communicate when they are uncertain about subject, topic, or contribution, just to mention a few. The findings from this study will serve as an eye-opener for researchers to further explore the role uncertainty is likely to play from a cross-cultural collaborative learning perspective and serve as knowledge for future studies to examine different interventions. Most importantly, the study will contribute a novel method of analysis for identifying the relationship between uncertainty utterances and knowledge building.

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