

Zhang, J. (2013). Collaboration, technology, and culture. In Cindy Hmelo-Silver, Angela O'Donnell, Carol Chan, & Clark Chinn (Eds.), *International Handbook of Collaborative Learning* (pp.495-508). Philadelphia, PA: Taylor & Francis.

Chapter 34: Collaboration, Technology, and Culture

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Introduction and Overview

Culture has a deep impact on how people learn and interact, what type of learning is highly valued, and what technological uses are preferred (Chan, 2008; Nisbett, 2003; Tweed & Lehman, 2002; Watkins & Biggs, 1996; Zhang, 2007). Understanding cross-cultural differences in learning and fostering cross-cultural interaction and reflection has, thus, become an important research topic. The significance of this topic is heightened by international assessments that place some nations ahead of others on various measures (OECD, 2010; Stigler & Hiebert, 1999). Research on collaborative learning and related computer support is rooted in a socio-cultural perspective and has involved an international community of researchers. Computer-mediated communication and learning environments provide unprecedented opportunities for learners from different cultures to interact and collaborate, and for researchers to investigate such cross-cultural interaction and collaboration (Kim & Bonk, 2002; Lin & Schwartz, 2003). Therefore, researchers of collaborative learning call for systematic efforts to investigate culture's impact on the design and implementation of collaborative learning and cultural transformation underpinning classroom innovation (Vatrapu & Suthers, 2007; 2009; Zhang, 2010). The purpose of this chapter is to identify focal

issues in this research area, synthesize conceptual underpinnings and empirical findings that can be built upon, and highlight educational implications and directions of future research.

The concept of culture is famous for being difficult to define and having diverse meanings. Vatrappu and Suthers (2007) reviewed the different definitions of culture and identified Hofstede's (2001) definition as most appropriate for cross-cultural research on collaborative learning and technology. According to Hofstede (2001), culture is "the collective programming of the mind that distinguishes the members of one group or category of people from another." (p. 9) Interpreting culture as the collective programming of the mind—or cultural schema—aligns with the Vygotskian socio-cultural perspective of the social formation of the mind (Wertsch, 1985). This collective programming is co-constructed by members through participating in shared cultural practices. It manifests as shared values, norms, and thinking styles of a cohort group (e.g. a community or a nation) that rises above members' heterogeneity within the group. Culture, thus, represents the group members' collective particularity (Vatrappu & Suthers, 2007) that does not exclude individual variation and diversity. Characteristics identified at a collective and cultural level cannot be uniformly attributed to each of the individuals, who may simultaneously engage in and interact with multiple cultural communities and, thereby, constantly reconstruct their identity through lived cultural experience (Gutiérrez & Correa-Chavez, 2006).

This chapter synthesizes research that intersects with several scholarly areas including computer-supported collaborative learning and collaborative work (CSCL & CSCW), computer-mediated communication (CMC), cross-cultural psychology, and cultural studies of education. It begins with examining cross-cultural variations, focusing on how learning, communication, and collaboration are conceived and approached in different cultures that

have distinct beliefs, values, and traditions. In light of the cultural diversity and variation reviewed, the second section synthesizes research on cross-cultural learning and collaboration to enhance intercultural enrichment and complementarity for learners' mutual benefit. Finally, cultures, although relatively stable at the national level, are in constant evolution (Hofstede, 2001). The 21st century is witnessing social and cultural transformations characteristic of globalization, participatory networking, creativity, and flexibility in both public and personal realms, posing new challenges and demands to education (Florida, 2002; Lei & Zhang, 2010). Addressing these challenges, research on collaborative learning has generated various pedagogical and technology innovations to evolve creative learning communities among students as well as teachers. Implementing these innovations in different cultural contexts for deep change requires adapting cultural beliefs (e.g. views of knowledge) underlying educational practice and responding to culture-specific conditions and challenges. Thus, the third section of this chapter discusses ways to foster collaborative knowledge building in different cultural contexts for educational change, underlining a principle-based approach to classroom innovation.

Cross-Cultural Variations in Learning Interaction and Collaboration

Cultures vary along a number of dimensions (e.g., Hofstede, 2001; Nisbett, 2003), which have significant influences on learning, communication, and collaboration. The cultural dimensions provide a framework to analyze and characterize cultural differences without implying any evaluative judgment. This section reviews research related to four dimensions each representing a continuum instead of dichotomy: individualism-collectivism, power distance, analytical and holistic thinking, and high- and low-context communication.

Individualism-Collectivism

Individualist cultures (e.g., the US) emphasize independence, agency, and choice of individuals with loose social ties; whereas collectivist cultures (e.g., East Asian societies) emphasize interdependence and value collective over individual interest. Compared to individualist cultures, collectivist societies give more weight to social expectations, norms, and rules in education (Li, 1996) and tend to discourage individual initiative, interest, and distinctiveness (Nisbett, 2003). Students are urged to acquire socially recognized knowledge and moral principles and transform their thinking and behaviors accordingly (Tweed & Lehman, 2002; Zhang, 2007). Collectivist thinking is conducive to collaborative learning as it encourages students to contribute to shared goals and activities and learn with and from peers (Freedman & Liu, 1996). As Tang (1996) observed, although formal small-group learning is relatively new in China, informal collaborative learning has long been practiced in Chinese classrooms. These informal collaborative learning practices occur despite the pressure of high-stake examinations that increase student competition.

Studies have compared learner collaboration and communication in collectivist and individualist cultures. Participants from collectivist cultures are more relation-oriented and used to face-protection and politeness strategies to minimize imposition and avoid hurting others' feelings with negative comments. In contrast, students from individualist cultures are more outcome- and task-oriented, paying more attention to clarity and efficiency of communication and completion of tasks (Kim, Hunter, Miyahara, Horvath, Bresnahan, et al., 1996). In a study by Kim and Bonk (2002), American and Korean college students co-engaged in online discussions about school-related problems. The Korean students contributed more postings to share personal feelings in support of positive relationships. Their American counterparts were more task-oriented and pragmatic, focusing on developing

solutions to the problems. Similar patterns were found in an experimental study by Setlock and colleagues (2004), who investigated collaborative decision-making in a face-to-face or instant messaging (IM) environment. Participants were paired in a way to create three cultural groupings: American-American (AA), Chinese-Chinese (CC), and American-Chinese (AC). Content analysis of conversations showed that the CC pairs used more “we” pronouns—as opposed to “I” pronouns—and more social language to show respect and politeness such as through inviting partner’s input. Two argumentation strategies were further identified (Stewart, Setlock, & Fussell, 2004): (a) a quick agreement process for the AA pairs, who tended to state personal claims and negotiate solutions that they could quickly agree upon; and (b) a slow agreement process for the CC pairs, who devoted more discourse moves to offering reasons for claims and understanding their different perspectives. Similar observations were reported by Seo and colleagues (2008), who analyzed student discourse in an online course that was shared between an American and a Hong Kong university. The Hong Kong students posted more messages to invite peers’ opinions whereas the US students made more claims about their own views.

Power Distance

Associated with the degree of collectivism-individualism, cultures also vary in power distance—the extent to which members of a society accept and expect that power be distributed unequally. Societies with a large power distance tend to accept a hierarchical order in which everybody has a place without needing further justification. Those with a small power distance strive for equal power and demand justification for inequalities (Hofstede, 2001). Asian societies are characteristic of a larger power distance (Bond & Hwang, 1990). Accordingly, Asian schools tend to place more emphasis on respectfulness, strictness, and

discipline (Aldridge & Fraser, 2000; Jin & Cortazzi, 1998) often at the cost of children's independence and creativity (Ho & Kang, 1984; Zhao, 2009). As several studies suggest, Chinese students tend to be more respectful of their teachers than Western (e.g., British and Australian) students (Aldridge & Fraser, 2000; Jin & Cortazzi, 1998); and are more likely to see text and the instructor as authoritative sources of knowledge (Lei & Zhang, 2010; Pratt & Wong, 1999). They prefer to first understand what these sources offer before questioning, commenting, and criticizing. In contrast, Western students and educators tend to attach greater importance to questioning and criticizing early in the learning process (Tweed & Lehman, 2002). In a study on computer-supported learning interactions among middle school students, Freedman and Liu (1996) found that Asian American students asked fewer questions to challenge peers and teachers and were less likely to use exploratory, trial-and-error inquiry strategies. Students from high power distance cultures also prefer to work in more structured learning environments with clear objectives and guidance (Pratt & Wong, 1999). Therefore, in computer-supported collaborative learning, Hong Kong students' discourse spaces tend to be more structured, such as based on topics and sub-topics, as opposed to student-directed, less-structured, and emergent discourse often found in North American contexts (Chan, 2008). In face-to-face and online social interaction, East Asians are more sensitive to distance in power among participants, and when such power distance exists, they are more likely to use indirect conversation strategies to show respect, avoid negative comments, and protect the face of the participants who have a higher power status (e.g., teachers, seniors, experts, leaders) (cf. Brew & Cairns, 2004).

Analytical and Holistic, Dialectal Thinking

People from different cultural traditions show different thinking styles in viewing and reasoning about the world, which have a deep impact on student learning and discourse. For example, different thinking styles have been observed between Asians and Westerners (Nesbett, 2003). Inheriting Eastern philosophy (e.g., Confucianism, Taoism, Buddhism), East Asians see the world as a complex and interconnected whole in constant flux, which can be best understood using a holistic approach through personal experience, reflection, and wisdom (Nisbett, 2003). Thus, they attend more to environments, contexts, and relationships and are reluctant to simplify the whole as isolated objects. Westerners, inheriting the philosophy of Ancient Greeks, are more used to analytical thinking, which compartmentalizes the world into a limited number of discrete objects and then categorizes the objects based on clear logical rules (Nisbett, 2003).

Such different thinking styles favor different approaches to curriculum, teaching, and learning interactions (Stigler & Hiebert, 1999; Watanabe, 1998). When it comes to collaborative learning in particular, the different thinking styles lead to different ways to deal with conflicting perspectives and arguments, which are essential to productive discourse (Andriessen, 2006). When confronted with conflicting propositions, Americans and other Westerners are more likely to use a logical approach to reject one of the propositions in support of the other to avoid a possible contradiction. As a result, argumentation and debate becomes a pervasive pattern of discourse across social sectors including academia, often resulting in polarized views. East Asians often favor a dialectical approach to conflicting perspectives to find truth in both sides in search of the Middle Way (Nisbett, 2003). As a result, they tend to avoid direct arguments, and when disagreements emerge, they are inclined to connect with others' goals instead of merely focusing on their own goals (Hampe, 2005;

Stewart et al., 2004). Grounded in an analytical thinking style, argumentative writing and discourse typically follows a rhetoric structure that involves background, problem, hypothesis or proposition, means of testing, evidence to support an argument and refute possible counter arguments, and conclusions. This structure is familiar to Western students but foreign and challenging to many Asian students who have been cultivated with dialectical thinking (Nisbett, 2003).

Collaborative learning designs need to take into account such cultural differences to engage students in productive reasoning and discourse. On one hand, researchers and educators need to tackle the challenge to help students from non-Western cultures appropriate argumentative discourse. On the other hand, it is also important to capitalize on the value of collectivist, dialectical thinking in resolving arguments and constructing intersubjective understanding. In the experimental study mentioned previously, Stewart and colleagues (2004) engaged American and Chinese college students in collaborative decision-making, either face-to-face or via instant messaging. In their conversations, the American participants devoted more discourse moves to making personal claims, followed by quick convergence to achieve their instrumental goals (i.e. resolving the task) without necessarily changing their personal understanding. The Chinese participants devoted more discourse moves to offering reasons for different claims, making clear where they disagreed, connecting the different perspectives to achieve cooperative goals. This complex process of argumentation led to true consensus and transformed individual understanding. Thus, collaborative learning designs need to accommodate and integrate the different patterns of discourse, rooted in different cultural traditions, to complement and enrich each other for knowledge advancement.

Low- and High-Context Cultures

Another cultural dimension pertaining to collaboration and communication is low- versus high-context. Communication in low-context cultures (e.g., Germany, the US and other Western nations) requires coding meanings in words in favor of explicit rational information (Hall, 1976; Lustig & Koester, 1999). In contrast, communication in high-context cultures, such as Arabs, China, India, and Japan, relies heavily on physical and social contexts (e.g., social cues, vocal tones, relationships) to achieve mutual understanding, with relatively less information explicitly encoded in words. The low-context communication in Western societies aligns with their analytic thinking style that dissects the world into increasingly differentiated objects each having particular attributes, which can be captured in language (Nisbett, 2003).

Several studies have examined computer-mediated communication and collaboration among participants from high- and low-context cultures. Setlock and colleagues (2004) investigated collaborative decision-making in different cultural groups working either face-to-face or via instant messaging. Participants were paired to create three cultural groupings: American-American (AA), Chinese-Chinese (CC), and American-Chinese (AC). The CC pairs talked more face-to-face than via instant messaging in which non-verbal cues were deprived. They also engaged in more extensive conversational grounding than the AA pairs to build mutual understanding about the task and context in the first phase. Using a similar research design, Vatrapu (2008) examined collaborative problem solving among different cultural dyads supported by a knowledge mapping and inquiry environment. Compared to the Chinese participants, the American dyads created more messages in online discussions, consistent with a low-context communication style that explicitly codes meanings in words. Focusing on cultural preferences of communication media, Massey and colleagues (2001)

found that Asian participants were less satisfied with asynchronous communication tools, such as online forums, in which they could not receive continuous and instant feedback. There is also evidence showing more frequent use of visual and audio components in online communication among Asian participants than in Western cultures (Choi, Lee, Kim, & Jeon, 2005; Kayan, Fussel, & Setlock, 2006).

In sum, cross-cultural differences identified along the various dimensions have a visible impact on student learning interaction and collaboration in both face-to-face and online environments. Research to identify and evaluate productive patterns of collaborative learning needs to consider both culture-bound and culture-neutral aspects to understand the cultural meaning of the discourse patterns for the participants involved. Designs of collaborative learning environments need to adapt to learners' diverse cultural profiles in order to best support their communication, collaboration, and learning. The cultural dimensions provide a framework to characterize learners' cultural profiles and create learner cultural models that can be embedded in collaborative learning systems. Various survey tools have been developed to characterize learners' cultural attributes and preferences on an individual basis (see Vatrappu, 2008) instead of simply based on student ethnicity and nationality. Drawing on such learner data, collaboration systems may provide learners with culturally adaptive communication tools and scaffolds (e.g. prompts) of collaboration (Economides, 2008).

Cross-Cultural Learning and Collaboration

Capitalizing on the Benefits of Cross-Cultural Learning and Collaboration

Bringing together diverse views is helpful for problem solving and deep understanding. "We would expect that for most problems one would be better off having a mix of people from different cultures than having people who are all from one culture." (Nisbett, 2003, p.

217) Education in the age of globalization needs to create cross-cultural and multicultural learning experiences for students supported by information and communication technologies. Existing research suggests important benefits to be gained from carefully designed cross-cultural collaboration and interaction (Levin & Cohen, 1985; Lin & Schwartz, 2003). In a culturally diverse learning community, students can access diverse perspectives, styles of thinking, and approaches to learning, and further connect to diverse social practices in different cultures. Such benefits have been demonstrated through the pioneering work of Levin and Cohen (1985), who engaged students from California, Illinois, Japan, Mexico and Israel in a collaborative project to tackle the problems of water shortage. Through sharing and analyzing local actions and strategies to cope with this problem, the students expanded their understanding, identified unique strategies used in other cultures, and recommended these strategies to their local communities.

In addition to cognitive benefits, interacting with peers from different cultures may trigger deep reflection upon one's identity and practice, leading to transformative learning. Lin and Schwartz (2003) asked American and Chinese students and teachers to design an "ideal student" for their classes. The American participants listed more behavioral properties (e.g., follow rules) while those from China valued more learning-related properties (e.g., explain clearly). Realizing such difference was so striking to the American teachers that they immediately started to reflect on their practice and ways to change it. Focused on advancing collaborative knowledge building in classrooms, the author of this chapter (see Zhang, 2010) coordinated a multi-year initiative that involved teachers from different cultures and nations to share classroom practices, with researchers applying various analyses to produce feedback data. Observing and discussing diverse classroom strategies adopted by international

colleagues, benchmarked by evidence of student engagement and progress, helped the teachers to reflect on their practices, identify common and unique challenges, and co-develop effective classroom designs. In an example analyzed by Lai and Law (2006), two elementary teachers, from Hong Kong and Toronto, respectively, engaged their students in collaborative knowledge building about civilizations supported by Knowledge Forum. Through reading online discussions, the Hong Kong students noticed that their Toronto partners generated more questions and disagreements. Discussing and reflecting on this difference helped the Hong Kong students to improve their engagement, leading to more active problematizing moves in the subsequent online discourse.

Cross-cultural collaboration is challenging and requires learners to be sensitive to their partners' cultural expectations and reflective about their engagement. Culture, as collective programming of mind (Hofstede, 2001), provides a set of cognitive schemas related to various social situations. While engaging in collaborative learning with such schemas, participants interpret the interaction context and develop intuitions about what language and actions might be appropriate or inappropriate and how their partners may respond. In collaborative learning among learners with different cultural beliefs and expectations, learners may find that their partners' behaviors and responses violate their expectations. Without reflective adjustment, such cultural misalignment may cause frustration, misunderstanding, and lack of trust. In a study by Prasolova-Forland, Wyeld, and Chang (2008), students from Australia, Norway, and Taiwan engaged in collaborative tower design in a 3D virtual environment. Through engaging in and reflecting on their online interaction, the Norwegian and Australian students learned adaptive strategies (e.g. talking about personal issues before getting to the task) to collaborate with their Taiwanese partners, who came from a high-context culture. However,

misunderstandings emerged between the Norwegian and Australian students who complained each other of being too dominating or bossy.

Further addressing the challenge of cultural gaps to enable productive and enjoyable collaboration requires training and scaffolding of intercultural competence (Lustig & Koester, 1999). With intercultural competence, learners recognize that people growing up in different environments carry different “mental software” (Hofstede, 2001). They develop sensitivity to cultural differences along with knowledge and skills about the specific cultures they are interacting with, including the values, symbols, rituals, habits of thinking, and so forth. Such competence helps students from different cultures to engage in reflective and creative interaction to facilitate a new system of orientation as their shared, emergent “interculture” (Rathje, 2007). The willingness to understand and learn from other cultures can be enhanced through humanizing cultural exchanges (Macrae, Stangor, & Hewstone, 1996), so that participants will perceive their peers as persons from a different culture instead of based upon cultural stereotypes. In a study by Lin and Schwartz (2003), a group of Hong Kong students were asked to comment on stories written by their American peers. Their comments and feedback were more positive and encouraging when they had the opportunity to read not only the stories but also information about the authors’ personal thoughts (e.g. how their stories had been created).

Implementing Collaborative Knowledge Building in Different Cultures for Educational Change

Cultures in the 21st century are witnessing transformations characteristic of globalization, networking, participation, creativity, and flexibility in economic, socio-political, and personal life, with collaborative and creative knowledge practices pervading

most social sectors (Florida, 2002; Lei & Zhang, 2010). Collaborative learning research suggests new models of schooling in the 21st century, focusing on engaging students in collaborative knowledge building supported by new technologies. Enacting collaborative knowledge building requires students and teachers to embrace a set of new cultural beliefs that depart from traditional schooling (Bielaczyc & Collins, 1999): knowledge as improvable ideas instead of end answers; learning as sustained inquiry for deep understanding (Hakkarainen, Lipponen, & Jarvela, 2002; Hewitt, 2002); students as co-investigators with their teacher to advance collective knowledge in a community (Scardamalia & Bereiter, 2006; Stahl, 2006; Tabak & Baumgartner, 2004). Transforming education in line with these new beliefs and perspectives represents a global challenge; however, some of these beliefs might be more foreign and challenging for some cultures than for others. For example, a constructivist, democratic view of knowledge is more foreign for teachers from Eastern societies, who, in the meantime, may be more receptive to the notion of collective and shared knowledge. Therefore, fostering educational change through collaborative knowledge building requires creating culturally adaptive innovations that build on unique cultural values and practices and address context-specific challenges. Instead of simply adopting standard procedures of collaborative learning, teachers need to work as designers and innovators to construct pedagogical understanding and develop classroom designs and practices accordingly in their local contexts (Barab & Luehmann, 2003; Zhang, 2010).

Collaborative learning programs cannot be simply disseminated to different schools and cultures through wholesaling a standard set of activity procedures and tools, which often only results in surface changes (Brown & Campione, 1996; Zhang, 2010). Appreciating the complexity involved in the transformation of cultural beliefs and practices, recent research

underlines a principle-based approach to classroom innovation (Brown & Campione, 1996; Zhang, 2010). A principle-based innovation defines a set of core educational values and principles to inform pedagogical understanding and decision-making of teachers. Instead of implementing pre-scripted activities, teachers are in the position to make reflective interpretation, discretionary judgment, and adaptive classroom decisions, supported by technological tools, sample lessons and assessments, and other resources (Zhang, 2010; Zhang, Hong, Scardamalia, Teo, & Morley, in press). They work with principles of collaborative learning and knowledge building as instructional design parameters to create and improve specific classroom procedures and generate principled reflections, insights, and classroom strategies to address common and local challenges. Among collaborative learning programs, knowledge building pedagogy supported by Knowledge Forum technology, developed by Scardamalia and Bereiter (2006), is a principle-based innovation that has attracted the most intensive international efforts, involving researchers, educators, and policy-makers from over 20 nations (Hong, Scardamalia, & Zhang, 2010). A number of studies have investigated teachers' enactment of knowledge building/Knowledge Forum in different cultural contexts (e.g. Chai & Tan, 2009; Chan, 2008; Oshima, Oshima, Murayama, Inagaki, Takenaka, et al., 2006; Zhang et al., in press). These studies shed light on the possibility and process for teachers to engage in principle-based innovation to address cultural challenges for deep change. Three of the processes are elaborated below.

Improving Pedagogical Understanding and Design through Collaborative

Experimentation and Reflection

A challenge to educational transformation comes from traditional educational beliefs and understandings that prevent educators from seeing and accepting new possibilities.

Principle-based innovation addresses this challenge by encouraging teachers to expose, reflect on, and improve their pedagogical understandings while developing and experimenting with specific classroom procedures and strategies. A recent study investigated the implementation and improvement of knowledge building/Knowledge Forum (Scardamalia & Bereiter, 2006) as a principle-based innovation in a Canadian elementary school over a decade (Zhang et al., in press). The teachers, working as a community, continually reflect on and discuss core issues related to classroom practice (e.g., nature of knowledge and learning, teacher-learner relationships) in light of the principles of knowledge building as they co-develop and test specific classroom designs. The principles highlight student epistemic agency in dealing with problems of goals, motivation, evaluation, and long-range planning—problems that are normally left to teachers (Scardamalia & Bereiter, 2006). The teachers reflect on and deepen their understanding of what epistemic agency means in relation to their practice and what level of agency can be enabled among a particular group of children, leading to specific classroom strategies to turn over more control to students. Flexible collaboration structures are developed to encourage students to group and re-group in the service of their emergent inquiry needs, with students engaged in co-designing classroom activities for productive knowledge building (see Zhang, Scardamalia, Reeve, & Messina, 2009). Through reflective observations of students' work, the teachers are impressed by the level of thinking and collaboration that their students are capable of, leading to increased trust in student agency and further efforts to turn over high-level control to students. Such principle-based understanding, experimentation, and reflection, advanced through teachers' collaborative sharing and dialogues, lead to sustained improvement of knowledge building practice judged based on student engagement and outcomes (Zhang et al., in press). Related studies in Hong

Kong, Taiwan, and Singapore converge with the above findings, suggesting that engaging teachers in a collaborative community to continually enact and reflect on principled-based practice of knowledge building leads to transformation of pedagogical beliefs (e.g. learner agency) and improvement of classroom practice (Chai & Tan, 2009; Chan et al., 2008; Chang & Hong, 2010).

Addressing Challenges and Constraints from a Coherence Systems Perspective

Enacting collaborative knowledge building faces specific challenges and constraints in different classroom settings and cultural contexts, ranging from traditional beliefs, mandatory examinations, rigid bureaucratic administration, time pressure, lack of technology resource and support, and so forth. Instead of being overwhelmed by such challenges and constraints, teachers need to understand that they are working within a complex system that requires progressive problem solving to develop coherent solutions to interrelated problems (Zhang et al., in press). They “need to be able to manage situations in which new knowledge about what to do must be created on the spot” (Lampert, 1999, p.168) in their context of teaching. As noted earlier, students from Eastern cultures often hold an authoritative view of knowledge and expect the teacher to provide more information and guidance (Tweed & Lehman, 2002). This view poses a challenge to the enactment of collaborative knowledge building that requires student to take on high-level control. Chan (2008) documented efforts made by a Hong Kong teacher to address the above and other challenges to implement collaborative knowledge building using Knowledge Forum. To help students become comfortable expressing their own ideas and contributing to knowledge building discourse, the teacher first incorporated discussions and question-asking in routine schoolwork. For example, students presented textbook readings followed by peer questioning and commenting. Such initial

experience helped students build the confidence and skills needed to contribute to knowledge building discourse, online and offline, and thereby move onto a trajectory of sustained knowledge building.

Building on Existing Cultural Practices for Opportunities of Innovation

To evolve creative learning communities in a cultural and school context, educators may identify potential components within their current practices as anchors for new practices to get hold onto, and redesign these cultural practices for knowledge building. In the aforementioned study by Chan (2008), the teacher from Hong Kong connected knowledge building and Knowledge Forum (Scardamalia & Bereiter, 2006) to two components pivotal to Chinese classrooms: homework and assessment. He modified student homework assignments to include discussions of core concepts in Knowledge Forum. As a part of students' final assessment and grading, he asked his students to submit a portfolio that summarized the best instances of their knowledge building discourse based on a set of principle-based criteria (e.g., progressive problem solving, van Aalst & Chan, 2007). These strategies helped to foster students' collaborative knowledge building leading to positive learning results. In another example, Oshima and colleagues (2006) conducted a design experiment to transform Japanese classrooms into knowledge building communities. As a part of their culture, Japanese teachers widely adopt a set of activity structures established through repeated research lessons (Rohlen & LeTendre, 1995). Oshima and colleagues identified such activity structures as a cultural practice to build on while making the activities more idea-centered for collective knowledge building. For instance, as a lesson activity, teachers often begin their classes by reviewing what students have learned and making transition to the new topic. This activity was adapted through incorporating authentic explanatory problems (e.g., would a dense block of

newspaper burn and why?) to stimulate student ideas and explanations. These ideas were shared and advanced as the focus of the community, tested and refined through group investigations, and further contributed in Knowledge Forum as objects of continual discourse.

In brief, evolving a new education framework centered at collaborative knowledge building requires extended efforts to adapt and accommodate the cultural assumptions underlying teaching and learning practices and address contextual challenges (Zhang, 2007). To support such efforts, a principle-based approach engages teachers to work as collaborative pedagogical knowledge builders to continually deepen and adapt their pedagogical understanding and develop increasingly effective classroom procedures and technology applications in their contexts. Systematic changes are needed to redesign educational goals, curriculum, and assessment and provide resources and support for teacher innovation (Law, 2008).

Concluding Remarks

Collaboration and learning are cultural activities. The development of 21st century pedagogies and technologies will not wipe out the cultural differences, but will likely increase the differences on the basis of preexisting cultural values and practices (cf. Hofstede, 2001). Research on the processes and designs of collaborative learning has been typically conducted in specific, mostly Western, cultural settings. Re-examining such processes and designs in cross-cultural contexts helps to validate existing findings, explicate and investigate cultural presumptions and practices, and further inform new research themes. Understanding learners' different cultural profiles related to collaborative learning will further inform culturally adaptive designs of learning environments and systems that can attune to the needs of different learners and support intercultural interactions.

Cultural studies of collaborative learning in computer-supported environment is a relatively new theme. In future cross-cultural research on collaborative learning, researchers need to increase the sample size and time span and integrate multifaceted analyses to obtain reliable and rich results. There is also a need to conduct longitudinal studies of classroom change employing collaborative learning pedagogies and technologies to provide elaborated accounts of teacher transformation and innovation in specific school and cultural contexts. Design-based studies can be further conducted to create favorable contexts for collaborative and creative classroom practices to evolve and thrive in different contexts. Advancements in pedagogical knowledge and practice generated by educators can be shared across classrooms and cultures through online networks for sustained improvement and innovation.

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