Beyond Demographic Boxes: Relationships Between Students' Cultural Orientations and Collaborative Communication

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Abstract: This study investigated relationships between students' cultural orientations and the ways in which they communicated with their peers in collaborative online discussions. 211 undergraduate business students from diverse backgrounds completed questionnaires directly assessing their cultural orientations along four dimensions (individualism, collectivism, power-distance and cultural-context). Scales were input into mixed multi-level models to predict 12 aspects of the way students communicated in their course-based collaborative discussions of business cases. Results based on a sample of 1565 posts showed that students with weaker context-based orientations posted messages that showed greater levels of reasoning, hard evidence use, autonomous tone and linear argument structures. In addition, the local discussion group context moderated the relationship between students' degree of collectivistic orientation and how they referred to and agreed with each other, as well as their expressions of social presence. Findings highlight the group/individual interplay in understanding relationships between cultural orientations and collaborative communication.

Introduction

This paper addresses a critical deficit in the current CSCL literature in attending to the diverse racial, ethnic and cultural background of today's students. While the field abounds with high quality studies of group processes, there is markedly less attention paid to the non-cognitive characteristics of the individuals who come together to engage in these interactions. Certainly, individuals are considered in the cognitive and behavioural sense. For example, scripts are designed to compose groups with complementary knowledge (Chan, 2009) or differences in opinion (Jermann & Dillenbourg, 2003) and analytics have been created to track imbalances in participation between students within a group (Janssen et al., 2007). However, attention to the personal factors that might influence *why* a student tends to participate less, hold a particular opinion or agree with others has been limited (c.f. Prinsen et al., 2007; Popov et al. 2014). Moreover, that work which has attempted to consider student diversity has often treated culture monolithically, using demographic proxies such as citizenship, race or gender (e.g. Prinsen et al., 2009) which assume a degree of uniformity across a group, thus precluding the examination of individual variations or the presence of multiple cultural influences within an individual. The myth of monolithic cultural groups is both seductive and pernicious in its oversimplification (Vatrapu & Suthers, 2010). Importantly, it simply does not match the reality of today's classrooms. For example, in 2011 the university participation rate within second-generation immigrants in Canada (which make up almost 20% of the population) was 53% (McMullen, 2011). Similarly, as of 2011 39% of the entire Canadian population came from ethnically diverse households (Dobson, Maheux & Chui, 2011). In fitting with the CSCL 2017 theme of improving equity and access, this paper takes an important step towards culturally responsive pedagogies by both offering a flexible and nuanced way to assess critical aspects of students' "culture" and by examining the relationship between these characteristics and ways students communicate in collaborative activities.

A need to understand the (whole) student taking part in collaboration

Studies of CSCL can coarsely be divided in two based on whether an individual or collective epistemology underlies the work. Studies taking a collective epistemology tend to consider language as constructing social reality and examine the joint construction of knowledge through processes of intersubjective meaning-making (Suthers, 2006). There is a long tradition of such work in the CSCL community including the study of knowledge building (Scardamalia & Bereiter, 2006), group cognition (Stahl, 2006) and many other related constructs. Studies taking an individual epistemology draw on a different set of assumptions, taking language to represent an individual's inner cognition and focusing on the different contributions made by learners (Wise & Paulus, 2016), but evaluations of these contributions are still often made in aggregate. For example, a particular script may be found to elicit more argumentative moves on average from a collaborating group (Scheuer et al., 2013). These two conceptual categories align roughly with the four methodological clusters of CSCL work identified by Jeong and Hemlo-Silver (2014): socio-cultural classroom / eclectic descriptive which tended to describe group processes based on qualitative data and constructivist classroom / eclectic experimental which generally used inferential statistics based on individuals aggregated quantitative data. What neither group of studies does well is consider the personal characteristics of the individuals involved and their impact on how

they take part in the collaboration. This is important because the students that make up a collaborative group are, by no means, all alike. They bring in different perspectives influenced by their cultural background, family upbringing, individual skills, motivation levels, life experiences etc. that influence the ways they communicate in online learning contexts (Chase et al. 2002). These differences are further compounded by the fact that online learning designs are often implicitly based on values held by the English-speaking Western world which may not be readily recognized or understood by learners from other backgrounds (Hannon & D'Netto, 2007). Yet such characteristics have rarely been discussed in the CSCL literature (c.f. Vatrapu & Suthers, 2010, Sugimoto & Suthers, 2002) and even less frequently addressed empirically (c.f. Zhu, 2013). The extremely limited work that has been done suggests not only do these factors matter for how students engage in collaboration but also the learning that results from it (Popov et al., 2014). If we are to seriously take up the challenge of developing culturally responsive pedagogies to increase equity and access in CSCL, we must first understand the cultural characteristics that are relevant to consider and how they affect collaborative dynamics.

Limitations in the use of demographic labels to index culture

While the personal characteristics of students has received limited attention within CSCL, the larger online learning literature is replete with studies attempting to link online communication behaviours with age, gender, ethnicity and citizenship differences of students (e.g. Rovai & Baker, 2005; Warden, Chen & Caskey, 2005). Such use of demographic labels as proxies is a widespread practice. For example, Schaffer and Riordan (2003) reported that 79% of studies in the organizational research literature from 1995 to 2001 examining culture used nationality as a proxy. While broad demographic labels may provide some useful insights into differences in behaviour overall, they are unlikely to be useful in predicting or explaining the activity of particular students. This is because conclusions from such studies necessarily make the assumption that all students that belong to a given "culture" (i.e. nationality, ethnicity, race) to be monolithic, i.e. identical to all those reported by the category at large. The limits of such dichotomous thinking with respect to learner activity has been shown time and time again, most recently in the debunking of the digital natives and immigrants myth (Bennett & Maton, 2010). The limited work in CSCL looking at cultural orientations (e.g. Popov et al., 2014) has also used demographics as a proxy. A better alternative to demographic labels is to directly identify and report results based on individual characteristics that are hypothesized to directly influence collaborative behaviours. Cultural orientations are one good example. Culture has been defined in many ways, but is generally taken to refer as a set of attitudes, values, beliefs and behaviours shared by a group of people, but different for each individual, communicated from one generation to the next (Matsumoto, 1996). These specific values, beliefs and attitudes are then the orientations towards interacting with the world that are influenced by being a member of the cultural group. For example, those who come from western cultures are thought, on the whole, to hold stronger individualistic orientations than those who come from eastern cultures (Warden et al., 2005). Of course, a particular person's individualistic orientation will be influenced not only by their ethnic origin but also by other factors such as their country of residence, familial dynamics and life experiences. By conceptualizing and measuring a collection of orientations for each individual we allow for the multiplicity of proclivities which can exist simultaneously within a person and the plurality of influences (multiple cultures, languages, geographies) on the orientations each one holds. Cultural orientations are also a more useful way to look at culture because they are more causally proximate to collaborative behaviours than demographic labels (they more precisely describe the characteristic of an individual thought to lead to a behaviour) and because they allow for more nuanced measurement (Vatrapu & Suthers, 2010; Perera, 2016).

Conceptualizing students' cultural orientations

Of the many cultural frameworks in existence, that introduced by Hofstede in 1984 (Hofstede et al., 2010) is one of the most frequently cited. Many subsequent frameworks were influenced by this seminal model (e.g. Shulruf et al., 2011; Singelis et al, 1995). The original framework included four major cultural orientations to characterize differences in values, beliefs, norms and behaviours across countries: individualism/collectivism, power distance, masculinity/femininity and uncertainty avoidance (Hofstede et al., 2010). Of these four, individualism / collectivism and power distance have special relevance for CSCL (Zhu, 2013). Individualism / collectivism refers to an individual's tendency to situate themselves as part of, and identify with, a group and their orientation towards self-expression focusing on the projection of a unique identity for themselves and others (Hofstede et al., 2010). While individualistic and collectivistic orientations were originally conceptualized as a bipolar scale, the co-linearity of these scales has been questioned as over-essentializing the multiplicities of today's learners. Empirical evidence suggests that they are more usefully be considered to be orthogonal (Perera, 2016) such that an individual can hold a strong individualistic and a strong collectivistic orientation simultaneously. Power-distance refers to the degree to which an individual is willing to accept or

reject differences of equality and authority within a group (Hofstede et al., 2010): those with a higher power-distance orientation are more likely to look to a teacher for answers while those with a lower power-distance orientation may be more likely to value the ideas of their peers (Zhu, 2013). Another cultural orientation described in the literature with particular relevance for CSCL is the degree to which someone is context-based: this refers to the degree to which an individual uses context to create, communicate and interpret meaning (Hall & Hall,1990). Those with lower context-based orientations tend to be more explicit in their communication, explaining their meaning precisely with the words they use in their messages; those with higher context-based orientations expect listeners to read between lines and rely on surrounding talk and the situation in which it occurs to understand the message fully. Both scales have been empirically verified as bipolar (Perera, 2016).

The current study

The overall purpose of this study was to investigate relationships between students' cultural orientations and how they communicate with their peers in collaborative online discussions. Four relevant dimensions of cultural orientations were outlined above. The following sections address the issues of what aspects of students' collaborative communication merit examination and how to account for collaborators' lack of independence.

Examining individuals' communication in collaborative contexts

Two common dimensions of communicative acts frequently referenced in literature: the extent to which a student attends to the substantive content of the discussion task and the extent to which their comments are attended to by others (Wise et al., 2014). Attention to the task encompasses issues related to being on/off topic, features of evidence use and reasoning, and the form in which ideas are argued while attention to others addresses issues of responsiveness, (dis)agreement and message tone (Hsiao, 2012). Previous studies (Salleh, 2005; Vatrapu & Suthers, 2010) have shown how various factors along each of these dimensions can be influenced by student's cultural characteristics. For example, the amount of evidence and first person pronouns (autonomous tone) used in messages were found to be influenced by low context-based orientation of students.

Using multilevel models to account for nested group effects

Students' comments in collaborative activities are by definition not independent of each other (on the contrary if they are then we need to reconsider whether the activity can truly be called collaborative). This raises both conceptual and statistical issues for CSCL researchers when attempting to examine the activities of individuals distributed across multiple groups. Specifically, phenomena such as common fate and reciprocal influence make it likely that individuals participating in the same small group will act more similarly to each other than to those in other groups by virtue of their joint participation (Cress, 2008). *Conceptually* this implies that the local group context may moderate how particular cultural orientations become expressed in the comments students make (e.g. someone with a strong individualistic orientation may tone down (or amp up) the degree to which they project their unique identity if they find themselves in a group where no one else is doing so). This adds a layer of complexity to understanding the ways in which individuals' background affect how they communicate in collaborative contexts as both direct and indirect effects are possible. *Statistically*, when the assumption of independence is violated, it can lead to distortion in the final model (Cress, 2008) and the use of multilevel/hierarchical linear models (HLM) are required. These models are capable of handling observations that are not independent, as they take into account clustering effects of data by one or more grouping factors (Cress, 2008; Garson, 2013).

Research questions

1. To what extent are how students attend to (a) others and (b) the task in their online discussion posts predicted by their levels of (i) individualistic, (ii) collectivistic, (iii) power distance and (iv) context-based orientations?
2. Are any of these relationships moderated by the local group in which students participate in the discussion?

Methods

Study context

There were 221 participants from 280 students enrolled in one of two introductory-level marketing courses taught at a small Canadian university. The elements of the courses pertaining to the study were identical. Data was collected from eight course sections taught by the same instructor during summer and fall 2014.

Participants

58% of participants were female. While the majority of students (70%) were of standard university-age (17-22), a sizable proportion (30%) were mature learners (23+). Two-thirds of students were Canadian citizens; however, within this category there was great ethnic diversity with 41% of Caucasian descent, 27% of East Asian descent, 21% of South Asian descent and the remaining 11% from diverse backgrounds. Among the third of the class who were not Canadian citizens, the largest groups of ethnic origin were East Asian (57%), South Asian (22%) and Caucasian (5%), with the remaining 16% coming from diverse backgrounds.

Cultural orientations questionnaires

Students completed previously-developed questionnaires about their levels of individualistic and collectivistic orientation (Shulruf et al., 2011) and power-distance and context-based orientations (Richardson & Smith, 2007). All instruments asked students to respond to how often they thought or acted in a certain way (e.g. I think of myself as competitive) on a 7-point frequency scale (1=never 7=always). The internal consistency of all scales as indexed by Cronbach's alpha was satisfactory: individualism (15 items; $\alpha = .79$); collectivism (11 items, $\alpha = .68$); power-distance (11 items; $\alpha = .71$); context-based (17 items, $\alpha = .74$).

Collaborative case discussion activity

As part of their coursework, students were required to take part in three collaborative case-based online discussions worth 21% of their total course grade. Collaborative discussions took place in 24 small groups of 6-12 students across the eight sections. Students were assigned to groups at random. Due to non-participation and attrition, final group sizes were not equal. Each group included both males and females and students from different ethnic backgrounds. The discussion lasted for 10 days spaced across the semester, and were conducted in an installation of the asynchronous open-source discussion tool *Phorum*. For each activity, students were given an open-ended authentic business case (e.g. a local hotel introduced a fake brand name to sell pizza made internally within the hotel's restaurant) to address as a group. Students were asked to first identify the important issues pertaining to the case (in this situation relating to ethics). They were then asked to brainstorm possible ideas and finally come to consensus about how the characters in the case should proceed (in this situation how the hotel could increase their restaurant profitability without violating ethical principles).

Communication data collection and coding

Table 1: Variables Indexing How Students Attended to Others in their Posts

Variable	Definition (student level)	Coding Operationalization (post level)
Ref to Others	% of posts making references to others.	Binary code for presence/absence of reference
Some Disagree	% of posts with full/partial disagreement	Categorical variable with neutrality/full agreement/ partial disagreement/full disagreement
Full Agreement	% of posts with full agreement	
Social Presence	% of posts with social presence.	Binary code for social presence/absence
Autonomous Tone	Avg. level of first person singular pronouns use by post.	# of uses of pronouns (e.g. I, me, my, mine).
Connected Tone	Avg. level of first person plural pronouns use by post.	# of uses of pronouns (e.g. we, us, our, ours).

Table 2: Variables Indexing How Students Attended to the Task in their Posts

Variable	Definition (student level)	Coding Operationalization (post level)
Contextual Structure	% of posts made with contextual structure	Categorical variable for post structure as contextual (thoughts expressed circuitously) / linear / other
Reasoning	Avg. reasons level in a post	# of reasons coded into bins (0, 1, 2/3, 4//5, 6/7, 8+)
Evidence Refer	% of posts made referring to evidence	Categorical variable for no evidence / evidence mentioned / evidence explained
Evidence Apply	% of posts made applying evidence	
Hard Evidence	Avg. level hard evidence use by post	# of uses of independent evidence (e.g. citations)
Soft Evidence	Avg. level soft evidence use by post	# of uses of personal evidence (e.g. anecdotes)

221 consenting students generated a total of 4694 posts across the three case discussions. To keep post coding manageable, the second discussion was targeted. Tasks asked students to take an individual stance then negotiate with others to consensus, using evidence to support their claims. This invited students to agree / disagree with others, work collectively or individually to generate a shared solution, express (power) relations to others in the group and be more or less explicit in how they supported their claims with evidence. 211 of the 221 consented students took part in the second discussion, contributing a total of 1565 posts. All post data including author, title, content, and time/date stamp was extracted via mySQL query. All posts were coded by two researchers for twelve aspects of the way the student comments attended to others and to the task; codes were then rolled-up into student-level variables (see Tables 1 and 2). The post was taken as unit of analysis as it was the medium by which students communicated with the group and involved no challenges for segmentation (Schellens & Valcke, 2006; Wise & Paulus, 2016). 150 messages generated from the first online discussion were used as training data to refine the coding scheme and prepare the two coders. Inter-rater reliability as indexed by Krippendorff's alpha was high ($\alpha > 0.80$) across all elements of the coding scheme.

Statistical analysis

Multilevel models were set up and run with the student as the lowest-level unit. Examination of the Intra-class Correlation Coefficient (ICC) showed a significant and a substantial effect of the local discussion group for 10 of 12 variables, thus student-group was included as a second level in the models. ICC revealed little to no effect for course-section. HML7 was used to run Random Intercept and Random Slope (RIRS) models for each of the communication variables based on predicted relationships with cultural orientations. Expected relationships are indicated in Table 3; space precludes inclusion of the rationale but see Perera (2016). Log likelihood ratios (deviance statistic) were compared with those for the null models (baselined without predictors; Garson, 2013) to ensure predictor addition improved overall model fit. RIRS models produce estimates of fixed and random effects. Fixed effects include an intercept and a series of slopes estimated across the sample. This confirmatory portion of the model indicates presence or absence of predicted global relationship between cultural orientations and communication variables. Random effects also include an intercept and a series of slopes; however, in this exploratory portion of the model, a significant slope indicates an interaction between the cultural orientation variable and the local context of the discussion group in affecting the communication variable.

Results

Sixteen statistical assumptions required to run RIRS models (Garson, 2013) were verified. Six cases were dropped due to uni-/multi-variate outliers; final sample was 205. Apply Evidence outcome variable was dropped due to poor model fit. Results of the remaining 11 models are reported in Table 3. There was a negative fixed effect for Context-Based orientation on students' level of Autonomous Message Tone, level of Reasoning, use of Hard Evidence and Linear Argument Structures. No fixed effects of Individualistic, Collectivistic or Power Distance orientations were found. For random effects, the intercepts for Some Disagreement, Social Presence, Autonomous Tone, Refer to Evidence, and use of Hard and Soft Evidence were significant. This indicates some groups engaged in high levels of each of these communicative acts than others during the discussion. There were also significant random slope effects indicating interaction between levels of Collectivistic cultural orientation and students' local discussion groups on Reference to Others, Some Disagreement, Full Agreement and Social Presence. Three of the four accounted for large portions of the variance explained. In addition, significant interaction effects were found between the local group context and Individualistic, Context-Based orientations. No significant interaction effects were found for Power Distance orientation.

Table 3. Full Model Results

Speaking Variables	**Fixed (Global) Effects Slopes**				**Random (Group) Effects Intercept & Slopes**				
	IND	COL	POWR	CONTX	Intercept	IND	COL	POWR	CONTX
Refer to Others	0.041 (-)	-0.028 (+)	0.033 (-)		0.008	0.059 3%	**0.172***** **27%**	0.084 6%	
Some Disagree	0.032 (+)	-0.005 (-)	0.029 (-)		**0.001***	**0.003**** **7%**	**0.003*** **7%**	0.003 7%	
Full Agree		0.011 (+)			0.002		**0.011*** **20%**		
Social Presence		-0.027 (+)		0.037 (+)	**0.017*****		**0.019**** **18%**		**0.011*** **10%**
Autono. Tone	0.063 (+)			**0.327**** **(-)**	**0.485*****	0.052 3%			0.151 1%

Connect. Tone		0.065 (+)				0.035		0.040 7%		
Context Structure	-0.020 (-)			**-0.218***** **(+)**		0.003	0.002 4%			0.011 20%
Reason	0.034 (+)	0.026 (-)	-0.131 (-)	**0.212*** **(-)**		0.116	0.081 6%	0.212 17%	0.080 6%	0.152 12%
Refer to Evidence		0.013 (+)				**0.007***		0.000 0%		
Hard Evidence	-0.038 (+)		-0.140 (-)	**0.414**** **(-)**		**0.431*****	0.018 1%		0.046 3%	0.111 7%
Soft Evidence		-0.026 (+)		0.004 (+)		**0.006****		0.008 13%		0.011 20%

* p<.05 **p<.01 ***p<.001; (+) / (-) = direction of predicted relationships; % = percent of total random effect variance explained

Discussion

The results of the study confirmed certain cultural orientations to be useful predictors of students' collaborative communication. Specifically, students' degree of context-based cultural orientation was useful in explaining multiple aspects of how they attended to the task in terms of use of reasoning, hard evidence and systematic message structure, as well as the tone with which these were communicated. These findings align with prior work showing that people with low context-based orientations tend to use direct, precise and logical expression of ideas in their communications (Salleh, 2005) and expand the relationship to include the use of reasoning and evidence. This is important in online collaborative learning as providing reasons and evidence are elements of strong argumentation (Chinn & Osborne, 2010) which can encourage others to think deeply about the ideas presented and potentially change their own perspective in response. It may also draw out elaborated responses which offer further learning opportunities. The question of how to address the issue of students who have high context-based cultural orientations and are less likely to use reasoning and hard evidence in their collaborative communications is an open one. From a rationalist perspective, these students could be identified and encouraged to include these elements in their messages. This would address the issue of implicit western / anglo values embedded in online learning designs which may not be apparent to learners from other backgrounds (Hannon & D'Netto, 2007). However, such an approach also potentially raises the spectre of cultural imperialism. A more nuanced way to address the issue could draw on culturally conscious approaches that explicitly recognize value multiple style of communication and encourage students to code-switch between them appropriately (Delpit, 1988). In addition, instructors might consider ways to structure collaborative activities that present a need for or benefit to contextual styles of communication. The other major finding of this study was the presence of multiple effects of cultural orientations on students' collaborative communication that were moderated by the local group context. The most notable of these was for collectivistic cultural orientations which showed interaction effects on the degree of reference to others, the level of agreement /disagreement and the expression of social presence. This finding is noteworthy for two reasons. First, this finding provides empirical evidence to suggest that cultural orientations do not always affect behaviour directly, but in the context of the social situation in which students are placed in (in this case the group). It may also be the case that students who are multi-national, multi- cultural and multi-lingual themselves hold contradictory orientations which they bring to bear differently in different situations. Second, while collectivism is a commonly studied culture orientation (Oyserman et al., 2002), it was not a significant global predictor of any of the collaborative communication characteristics studied. It may be that this is because it is particularly susceptible to moderation by the local group context. This makes sense logically as the degree to which a student who is oriented towards identifying with the group (Hofstede et al., 2010) chooses to express social presence, refer to others and seek harmony through their messages may depend on characteristics of the group.

Implications for research and practice

The results of this study have two important implications for research. First, past research (including the current study) focused on commonly studied cultural orientations due to widespread use and the availability of measurement instruments. The popularity of Hofstede's (1984) cultural model and its use across multiple settings is indicative of this. However, the only significant global effects were found for the less commonly studied context-based cultural orientation (Hall & Hall,1990). This suggests that those orientations most often cited in the general literature on culture may not be best suited to differentiate and predict behaviours that take place in CSCL situations. In corollary, there may be other orientations (similar to context-based) more relevant for measuring differences in culture for CSCL; e.g. Parrish and Linder-VanBerschot (2010). Second, the results of this study reaffirm the importance of using multi-level models to account for the non-independence of

collaborating learners (Cress, 2008). Without the random effects part of the model, it would have (incorrectly) appeared that collectivistic cultural orientations had no effects on students' collaborative communication behaviours. Equally importantly, the finding of such interaction effects opens a new important area for inquiry into the characteristics of collaborating groups that moderate the way individual orientations are expressed in their communications.

The findings of this study also have two important implications for practice. The significant global effects highlight some of the ways in which cultural orientations directly predict students' online discussion behaviours. Knowing these characteristics of students by having them complete self-assessments prior to engaging in collaborative activities can be beneficial. Further, instructors can support students with particular orientations or integrate elements of these into activities in the ways described earlier. Another important implication for practice is heightened attention to the manner in which students are grouped for collaborative activities. While group composition has been considered in CSCL in terms of cognitive factors (Jermann & Dillenbourg, 2003), it has not yet attended to personal characteristics such as cultural orientations. Importantly, the assessment of individual cultural orientation offers a more fine-grained basis for determining group composition than demographic factors. As future work investigates specific group characteristics that moderate the effects of particular cultural orientations, more nuanced group formation guidance can be generated.

Conclusion

As we move into a complex, globalized and multicultural age, it is important to take students' cultural background and orientations into account as factors affecting computer supported collaborative learning. This study offered individually assessed cultural orientations as a more flexible and nuanced tool than previously used demographic labels. Results verified individual cultural orientations generally as a useful lens into students' online collaborative communication, with context-based and collectivism as specific orientations useful for prediction. The field needs to continue and build on this work by exploring a more diverse range of cultural orientations that may be relevant to collaborative learning contexts. In addition, results clearly documented the important role played by the local discussion group in moderating such effects and the need to better understand characteristics of the collaborating groups that can explain these interactions. This work thus adds to a growing chorus of calls for more CSCL work that connects levels of learning (Suthers et al., 2011) by examining both the group and the individual, and most critically the complex relationship between them.

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