

**DIGITAL NATIVES IN CHINA AND THE UNITED STATES:
IS TECHNOLOGY EFFECTIVE IN BUILDING TRUST?**

(当有信任, 没有证据是必要的

When there is trust, no proof is necessary—Chinese Proverb)

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摘要 ABSTRACT

We started this research by considering students' learning preferences. Our students, digital natives, seem to be enthralled with anything electronic. We were surprised that our findings did not support this. We compare students from China, a dramatically different culture, and the U.S. as they complete group assignments using three forms of interaction: face-to-face (FTF); social media (technology-based); virtual meetings (technology-based). We use a pre-tested survey to compare experiences and preferences of both samples. Similarities and differences are presented and discussed. Results indicate more effective project performance for both samples occur with FTF interaction than any form of technology-based communication. Both samples also agree that FTF is the most preferred form of interaction and virtual meetings are the least preferred. FTF interactions lead to higher performance than do virtual interactions, and outcome, grades, satisfaction, experience and efficiency are all higher. FTF communication is also more effective than social media in dividing up project work and encouraging the exchange of ideas.

U.S. students experience an even more positive view of FTF communication, while Chinese students rely more heavily on social media. The major role of social media for Chinese respondents is to gather additional personal information to expand the radius of trust. Since this expanded radius increases the comfort level, it allows for enhanced group and individual performance. The role of trust is the same in both American and Chinese cultures, although the Chinese need greater personal interaction to gain the requisite level of trust for high performance.

Keywords: U.S./Chinese comparative study, Digital natives, Group work, Face-to-face and technology-based communication, Trust.

引言 INTRODUCTION

A Confucian analect states: 三人行必有我師 -- If three walk together, one should be my teacher: You have something to learn from everyone.

We started this research by considering today's students and their learning preferences. Our students are sometimes called digital natives, who seem to be enthralled with anything electronic. We therefore expected to find that technology would be the basis for their preferred communication mode with other students when completing course assignments that require group interaction. Choi, Zeff and Higby (2017; 2018) found instead that American students much prefer FTF communication styles over any form of technology-based communication. As global interaction continues to expand and becomes more the norm, we were curious to see how students in other parts of the world might respond to the same issues presented to U.S. students. Chinese students come from a dramatically different culture and comparing this culture with that of the United States of America is the focus of the present study.

Many studies concentrate on the latter part of this Confucian analect, that is, they study the area of knowledge acquisition. This paper, however, is concerned with the communication processes used within group settings in classroom situations, concentrating instead on the former portion of this idiom. Our focus, therefore, is the communication methods used and preferred by students in their interactions with teammates during a group project. Rather than trying to understand the types of technology used by students in gaining knowledge for a college level course, we are interested in understanding how students interact in groups to enhance their learning experience. This paper is based on the premise that interaction with peers is both a beneficial and desirable part of the learning experience. Consequently, this research goes beyond the role of technology and the various forms that might take, including both social media and virtual meetings. Instead, consideration is given to the relative preference for and use of face-to-face (FTF) and specific forms of technology-based communication.

Students have a variety of learning styles and these style differences may be magnified as a result of coming from different cultural backgrounds. When classes have international students, particularly with an increase in group activities as a strategy to increase participation and provide a more complete educational experience, faculty may enhance student performance by accounting for these cultural differences. Hofstede's (2018) framework of country culture reminds us of the role that cultural differences play in understanding differences for inter-cultural comparisons. China represents a very different cultural experience than that reflected in the U.S. Indeed, it is essentially a polar opposite along four of Hofstede's six cultural dimensions (Hofstede, 2018). This paper presents results from a comparative study using data collected from students in the U.S. and China to help us answer our research question: what are the similarities and differences between Chinese and American student experiences when using FTF and/or technology-based communication in completing group projects?

文献评论 LITERATURE REVIEW

枪打出头鸟 Early birds get shot: Nonconformity gets punished

Culture is defined as "the collective programming of the mind which distinguishes the members of one group or category of people from another" (Hofstede, 1991, p.5). Collectivist societies have strong relations within the "in-group" (Pavlou & Chai, 2002) – the extended family and familiar acquaintances (Hofstede & Bond, 1988). In-group relations focus on maintaining harmony by

going along with the group's wishes and promoting long-term relationships (Bond & Smith, 1996). To maintain this desirable relationship with the in-group, the most important thing for an individual is to guarantee the group's well-being (Triandis, 1990). People identify with established attitudes in collectivist societies, which then become part of their inner group circle (Smith & Bond, 1993). On the contrary, members of individualist cultures, such as the U.S., are not predisposed to maintain group harmony. Internalization, rather than identification, is the more effective means of influence in an individualist culture (Bond & Smith, 1996).

Culture is used as the basis for examining business relationships between the West (particularly the U.S.) and the East (recently, especially China). And both Chinese and American cultures agree that trust is important in the development of these relationships (De Cremer, 2015). Trust is also important in influencing group processes and group performance (Alge, Wiethoff, & Klein, 2003; Mayer, Davis, & Schoorman, 1995; Morris, Marshall, & Rainer, 2002). In particular, trust is regarded as an essential ingredient for cooperation (Putnam, 2001). According to Triandis (1989), people in individualist cultures are more cooperative with group members than those from collectivist cultures when groups are formed for the first time.

Levels of trust differ across national contexts and societies as do both the nature of and the cultural support for trust (Delhey, Newton, and Welzel, 2011, Dyer and Chu, 2003; Zaheer & Zaheer, 2006). For instance, Fukuyama (1995; 2000) divides societies into high-trust and low-trust categories. Members of high-trust societies (e.g., Germany, the U.S.) normally have a ready trust for their compatriots, which continues until he or she proves untrustworthy. On the other hand, members of low-trust societies (e.g., China, Korea) only trust those they know best: family and close friends (Lewis, 2006). This concept of high/low trust is labeled as radius of trust by Delhey et al. (2011). In China, trust is automatically bestowed on the extended family while those outside the family are inherently distrusted (Child & Möllering, 2003). In a seven-nation study, Huff and Kelley (2003) show that a higher propensity to trust, and higher external trust, exists in business relations in the U.S. than in Asia. They note that collectivist cultures, such as those in Asian countries, exhibit a bias against out-groups, resulting in low levels of trust of outsiders. The Chinese create in-group membership with affect-based trust, necessary to account for a high level of collectivism, and Americans rely mainly on cognitive-based trust since their high level of individualism results in a much broader radius of trust (Chua, Morris & Mor, 2012; De Cremer, 2015; Delhey et al., 2011; Hofstede, Hofstede, & Minkov, 2010).

Digital natives is a term popularized by Prensky (2001) to describe people who have grown up fully immersed in digital technology, now adept and engaged in technology-based communication. Because the majority of students in college courses today are digital natives (Sarkar, Ford, & Manzo, 2017), we concentrate on this group of students in our survey and results. Digital natives describes the generation born roughly between 1980 and 2000 (Bullen & Morgan, 2011). Effective learning is more likely to take place when teaching styles are aligned with learning styles. Technology can assist digital natives during the learning process and, as a result, can enhance academic performance (Sarkar et al., 2017). While the use of digital technology is growing, and younger people use technology-based communication more than older people, empirical evidence clearly shows that issues arising from digital communication are not defined by age. Moreover, the implications for education resulting from digital use are far from clear (Bullen & Morgan, 2011).

Digital natives utilize two basic forms of technology-based communication: virtual communication and social media. Virtual teams are more effective when mutual trust exists between team members (Hakonen & Lipponen, 2009). Undergraduate management students' perceptions of what makes a successful virtual group were investigated by Gapp and Fisher (2012), who suggested a high level of comfort among group members was one of the critical factors for virtual group success. Trust, however, is harder to create in a virtual team that meets rarely, or not at all. Personal interaction is not available for reassurance, and often results in a decay of trust due to this long-distance communication (Jang, 2013; Lewis, 2006). The notion of swift trust, a form of trust occurring in temporary organizational structures which can include quick starting groups or teams, exists in virtual teams (Jarvenpaa, Knoll, & Leidner, 1998; Jarvenpaa & Leidner, 1998). Studies suggest that swift trust appears to be fragile and often wildly inaccurate (Crisp & Jarvenpaa, 2013; Lewicki & Bunker, 1996; McKnight, Cummings, & Chervany, 1998; Meyerson, Weick, & Kramer, 1996). Some of the failures in collaborative virtual learning environments are based on the lack of appropriate social interaction (Akar, Öztürk, Tunçer, & Wiethoff, 2004). They suggest that it becomes the instructor's responsibility to clarify misunderstandings between group members, e.g., when there is tension because of using different languages and coming from different cultures.

Social media, as indicated by Bartosik-Purgat, Filimon, and Kiygi-Calli (2017), is a useful tool of communication and cultural differences need to be included in the design of subject and teaching materials. Hall (1976) categorizes cultures according to whether they are high-context (e.g., China) or low-context (e.g., the U.S.). Communication in a high-context culture is one that relies on the context of the moment and the culture to provide much of the meaning, thereby leaving a lot unsaid. Communication in a low-context culture is just the opposite, that is, it requires all information to be transferred to another person since there can be no expectation of the context already being understood from the culture (Lewis, 2006). Thus, high-context individuals will need more social interaction before they can correctly understand a message. People in a culture of high peer pressure, which is a part of collective culture, tend to expect more reciprocity in social media interaction, especially among in-group members, because they are interested in tracking others in the group (Park, Jun, & Lee, 2015). Social media to support university learning “did not significantly predict academic performance as measured by CGPA [cumulative grade point average]. SMUNAP [social media usage for nonacademic purposes] . . . significantly negatively predicted academic performance” (Lau, 2017, p. 290).

The role of technology-based communication is widely studied (see, e.g., Sakar, 2012). When comparing these forms of communication to face-to-face communication (FTF), research studies “assert that face-to-face communication is superior to computer-mediated communication” (Purvanova & Bono, 2009, p. 344). Our research is intended to help students and faculty members better understand the role each of these three communication methods, FTF, virtual and social media, play in students' efforts to perform well on group project assignments in their university studies.

研究方法论 RESEARCH METHODOLOGY

The authors became interested in gaining a more complete understanding of Chinese student experiences in the classroom when they were involved in a series of seminars with Chinese businesspeople looking to expand into Western countries, including the United States. Our student body is comprised almost entirely of these digital natives, and our interest in how comparable Chinese students approached their studies is a natural outgrowth of our interests in our own

students. As interactions between Chinese and Americans continue to increase, furthering our understanding of this dramatically different culture becomes even more important. We had considerable interaction with a Chinese scholar and used this relationship to help us understand how Chinese students might interpret and respond to an existing student survey, created by Choi et al. (2018). This Chinese scholar translated the survey and collected data from her university. This university is State owned and operated. She was both very open and helpful in her contributions and discussions about Chinese students. However, she chose not to be included as a contributing author of this study.

Questionnaire Development

A 66-item survey, created by Choi et al. (2018) for collecting data from students at a U.S. university and used with permission in this study, was translated and pre-tested by a Chinese scholar so a comparative sample could be collected from students at a university in China. After data collection, the survey was back translated by an independent interpreter to ensure the quality and accuracy of the results. Due to translational interpretation, two questions (i.e., items 25 and 51) are excluded from the analysis. A four-point Likert scale (i.e., 1, "Strongly Disagree"; 2, "Disagree"; 3, "Agree"; 4, "Strongly Agree") was used for each question. A forced-choice questionnaire is preferred since it provides a more reasoned response (Smyth, Dillman, Christian, & Stern, 2006) and lessens the compromise effect, thereby decreasing the relative proportion of average responses (Dhar & Simonson, 2003).

Samples

南橘北枳 South Orange North Trifoliate Orange: Things change with their contexts.

American Students. U.S. student data were collected during the 2016-17 academic year at an urban Midwestern United States university. All 82 students were taking courses in a college of business administration and all of them are digital natives. Demographic information indicates 80.5% (66) of these students were born between 1990 and 2000, with the remaining 16 students being born between 1980 and 1989. Furthermore, 58.5% (48) are female and 60.9% (50) are graduate students. All but one student (98.8%) has access to and uses a smartphone, while every respondent indicates he/she has access to and uses a computer.

Chinese Students. Students at a state-run university in a large, industrial city in southeastern China filled out the same questionnaire in the summer, 2017. Usable surveys include 145 mainly undergraduate responses (7.6% [11] were graduate student responses). Three students (2.1%) were born between 1980 and 1989 while 97.9% (142) of all students in this sample were born between 1990 and 2000. Females comprise 65.5% (95) of the sample. Responses indicate 96.6% (140) have and use smartphones and 49.0% (71) have access to and use computers.

Analytical Approach

To help answer our research question, we test whether our respondents are significantly in agreement or disagreement with each item (significantly above or below the 2.5 neutral point of the 4-point Likert scale) using a one-sample t-test. The results of t-tests, the significance level, are shown in the column of each student sample in the tables. We also apply ANOVA analyses to see if the means of the students' responses are significantly different between U.S. and Chinese participants. The results of ANOVA analyses, *p* values, are shown in the last column of the tables. We use SPSS (version 22.0, 2013) to analyze questionnaire results.

RESULTS

不經一事 不長一知 Wisdom only comes through experience

Our research question focuses on the differences between Chinese and American students' experiences and preferences in using FTF, virtual communication and social media when working on group projects in their university classes. Although previous research focused on the impact of FTF, virtual communication and social media on performance, processes and preferences, we are more concerned about the potential impact of culture from these two samples. We present our results to maintain focus on this comparison. Of the 66 items on the questionnaire, agreement is found between both samples as to their conclusions (agree or disagree with the item) on 41 of the questions—over 60% of them. In all these cases, both samples responded significantly beyond the neutral point of 2.5 on the Likert scale. Of these 41 questions on which the two samples agree, 24 of them (58.5%) are significantly different in their level of agreement or disagreement with the item. We present the data in three sections and their corresponding Tables: agreement on results; difference in strength of response; and, difference on results. We also separate out the results dealing with virtual and FTF meetings, and social media and FTF interaction based on the results of Choi et al. (2018).

Agreement on Results and Strength of Response

Based on the experiences of both Chinese and American students, they agree on each of the 17 items listed in Table 1, below. In addition, all responses are significantly different from the neutral point of 2.5 on the Likert scale while not being significantly different in strength of response. For example, item 46 indicates that both groups of students disagree that virtual meetings result in better outcomes than FTF meetings, and there is no statistical difference in their strength of response.

Table 1. Agreement on Results and Strength of Response

	No	Question	China		US		<i>p</i>
			M	SD	M	SD	
Performan ce	46	Virtual meetings result in better outcomes than face-to-face meetings	2.13**	0.55	2.15***	0.59	.846
	43	I earn a higher grade when my group has more virtual meetings	2.21**	0.50	2.21***	0.68	.970
	17	I earn a higher grade when group has more face-to-face meetings	2.85**	0.65	3.00**	0.75	.112

	6	Our group performance improves most when only social media interactions are used	2.21**	0.68	2.02**	0.65	.050
	10	Virtual meetings provide more satisfaction than face-to-face meetings	2.13**	0.46	2.06**	0.65	.389
	53	My satisfaction with other group members is greater when we have more face-to-face meetings than virtual meetings	2.94**	0.62	3.00**	0.76	.504
	36	Virtual meetings provided better experience for me than face-to-face meetings	2.30**	0.55	2.23**	0.73	.451
	29	Virtual meetings are more efficient than face-to-face meetings	2.31**	0.75	2.20**	0.69	.255
Process	54	Face-to-face meetings result in stronger relations between team members than virtual meetings	3.08**	0.56	3.10**	0.81	.856
	35	Face-to-face meetings encourage project-related interactions between group members	3.20**	0.63	3.05**	0.72	.100
	33	Face-to-face meetings distract group members from project tasks	2.36*	0.68	2.21**	0.75	.123
	32	I am more often bored or uninterested during face-to-face meetings than I am in virtual meetings	2.21**	0.69	2.05**	0.69	.087
	3	Face-to-face meetings are more effective than social media interactions in encouraging the exchange of ideas	3.15**	0.62	3.07**	0.77	.400
	2	I gain more project-related information from face-to-face meetings than I do from virtual meetings	3.08**	0.59	2.96**	0.87	.247
	11	Communication is more effective in virtual meetings than in face-to-face meetings	2.10**	0.58	2.13**	0.73	.671
	50	Face-to-face meetings are a better way to divide project work than social media interactions	2.96**	0.53	2.90**	0.70	.484
Pf*	64	I prefer virtual meetings over face-to-face meetings	2.12**	0.67	2.12**	0.80	.995

*** $p < .001$; ** $p < .01$; * $p < .05$; n ranges from 143 to 145 (Chinese) and from 80 to 82 (American).

Virtual and FTF Meetings. Seven items on the questionnaire relate to performance issues comparing FTF and virtual meetings (see 46, 43 and 17, 10 and 53, 36, and 29 in Table 1, above). All of these questions indicate that both Chinese and American students' experiences suggest that FTF interactions lead to higher performance than do virtual interactions. So, outcome is better, grades are higher, satisfaction is higher, experience is better, and efficiency is higher with FTF rather than virtual meetings. Their experiences also indicate that FTF meetings have better processes than virtual interactions. Items 54, 35, and 2 indicate that relations are stronger, project-related interaction is more encouraged, and more project-related information is gained from FTF meetings. Both samples also concluded that group members are not distracted (item 33) and boredom occurs less frequently (item 32) in FTF interaction while communication is less effective in virtual meetings (item 11). Experiences of both student groups indicate that FTF interactions result in both higher performance and better processes than virtual meetings. They also agree that virtual meetings are not the preferred interaction method over FTF discussions (see item 64).

Social Media and FTF Interaction. Three items (6, 3 and 50) describe experiences with social media during completion of group assignments. FTF interactions are more effective than social media in dividing up project work and in encouraging the exchange of ideas. Both sets of students disagreed with the statement that social media alone most improves group performance.

Agreement on Results, Difference in Strength of Response

Survey results reflect that experiences of both the Chinese and American students are similar in their conclusions for the following 24 items in Table 2, below. They significantly differ, however, in the degree to which they agree or disagree with these survey questions. Twenty-two of these

items present a consistent pattern of responses whereby the U.S. students, compared to their Chinese counterparts, experience a more positive view of FTF interactions, whether in comparison to either virtual meetings or social media interactions, or simply describing the impact of FTF discussions. Likewise, when a question asks if one's experience with some other form of interaction is better than FTF encounters, the U.S. experience is described in greater disagreement than Chinese responses. So, for example, item 42 in Table 2, below, states that "Virtual meetings result in stronger relations between team members than face-to-face meetings." Both samples significantly disagree with this statement and the U.S. response is significantly more extreme than is the Chinese response.

Table 2. Agreement on Results, Difference in Strength of Response

	№	Question	China		US		<i>p</i>
			M	SD	M	SD	
Performance	24	Face-to-face meetings result in better outcomes than virtual meetings	2.86***	0.61	3.11***	0.71	.006**
	30	My class grade is improved with face-to face teamwork	2.86***	0.51	3.13***	0.68	.001***
	28	Social media helps groups work only after you get to know group members	3.21***	0.66	2.70*	0.77	.000**
	21	My groups perform better when meeting face-to-face than using social media	2.86***	0.60	3.09***	0.72	.013*
	40	Face to face interaction is a good way to improve group effectiveness	2.81***	0.63	3.15***	0.76	.000***
	59	My grades on group projects are better when I feel more comfortable with my group members	3.27***	0.54	3.09***	0.81	.045*
	12	The use of social media improves team effectiveness	3.02***	0.61	2.75***	0.64	.002**
	63	Face-to-face meetings help me to feel more comfortable with my group members	2.98***	0.57	3.16***	0.69	.033*
	37	Face-to-face meetings provide more satisfaction than virtual meetings	2.81***	0.64	3.05***	0.72	.009**
	14	Face-to-face meetings are more efficient than virtual meetings	2.72***	0.74	3.07***	0.75	.001***
Process	20	Face-to-face meetings are effective in building trust with group members	3.12***	0.61	3.34***	0.57	.009**
	42	Virtual meetings result in stronger relations between team members than face-to-face meetings	2.34**	0.69	2.13***	0.72	.025*
	23	Face-to-face meetings help me to get to know my group members better	3.15***	0.62	3.34***	0.74	.040*
	9	I find face-to-face interactions better than social media interactions	2.96***	0.65	3.22***	0.70	.005**
	4	Social media encourage project-related interaction between group members	2.94***	0.58	2.68*	0.63	.003**
	15	Group members are more focused on a task during a face-to-face meeting.	2.71***	0.69	2.91***	0.71	.036*
	52	I remember more information from face-to-face meetings than I do from virtual meetings	2.78***	0.65	2.99***	0.74	.030*
	38	I am often more confused after face-to-face meetings than I am after virtual meetings	2.26***	0.71	1.99***	0.72	.007**
	31	Communication is more effective in face-to-face meetings than in virtual meetings	2.71***	0.66	3.05***	0.79	.001***
	27	Social media interactions help me understand my group members' strengths more than face-to-face meetings	2.33**	0.70	2.11***	0.71	.028*
	41	Group members are more likely to ask for help in face-to-face meetings	2.84***	0.61	3.03***	0.70	.041*
Pe fe	58	I prefer to build trust with group members during face-to-face meetings as opposed to social media interactions	2.83***	0.74	3.22***	0.71	.000***

48	I like to be in teams where I know everyone beforehand	2.82***	0.59	3.01***	0.67	.026*
26	I prefer face-to-face meetings over virtual meetings	2.66**	0.73	3.21***	0.71	.000***

*** $p < .001$; ** $p < .01$; * $p < .05$; n ranges from 144 to 145 (Chinese) and from 79 to 82 (American).

Two items (48 and 59) do not relate to FTF interaction and result in both groups responding in a significantly positive way. American experiences lead to a stronger preference for knowing everyone beforehand while Chinese experiences suggest comfort level with group members is a greater determinant in grades than for U.S. students.

Virtual and FTF Meetings. Looking at Table 2, above, eight items compare FTF sessions with virtual meetings. In six of these items (24, 37, 14, 52, 31 and 26), both samples agree that FTF sessions are better and more preferred than virtual meetings. In particular, performance such as outcomes, satisfaction and efficiency are considered to result directly from FTF interaction significantly more than from virtual meetings. Better communication and information are also experienced more from FTF meetings. Item 26 reflects the higher preference for FTF over virtual meetings by both samples. In each of these results, moreover, the experience and preference of the American students are significantly more favorable toward FTF than of the Chinese students. The other two items (42 and 38) indicate that Chinese respondents have less negative experiences with virtual meetings resulting in stronger relations between team members while they disagree less than their American counterparts that they are more confused after FTF than virtual sessions.

An additional seven items describe situations where FTF interactions have a positive impact on both performance and process issues (see items 30, 40, 63, 20, 23, 15 and 41 in Table 2, above). On performance items, grade is more improved, group effectiveness is improved, and comfort level is higher with FTF communication. Likewise, on process issues, building trust is more effective, students know members better, people are more focused and are more likely to ask for help in FTF situations. In each of these experiences, both sets of respondents strongly and significantly agree with these statements, although the U.S. students, as we indicated by the pattern described earlier, are in significantly more agreement than the Chinese students.

Social Media and FTF Interaction. Several items indicate that Chinese and American students have similar experiences in their usage of social media in the completion of group assignments during coursework. Comparing these experiences involving social media's impact directly on performance and process factors suggests that Chinese students experience a more positive or less negative effect than the corresponding American students (see items 28, 12, and 4 in Table 2, above). Likewise, when analyzing the responses from the two student groups to items comparing FTF and social media interactions, Chinese students agree that FTF interaction is more effective than social media. However, they agree significantly less so than their U.S. counterparts. Items 21, 9 and 58 in Table 2, above, support this result. Item 27 indicates that the Chinese respondents disagree that social media provides more understanding of group members than FTF meetings and do so less than American students. Thus, Chinese students, while acknowledging the more positive impact of FTF interactions on performance, have a more positive view of social media than American students.

Disagreement on Results

Table 3, below, reveals very different experiences between our two samples. Thus, the conclusions from these experiences are also very different. Item 39, for example, indicates that American students are neutral to the statement that several virtual meetings are more effective than one long FTF session, while the Chinese respondents agree with it.

Table 3. Disagreement on Results

			China		US		
	No	Question	M	SD	M	SD	<i>p</i>
Performance	34	My grades suffer when more virtual meetings are used	2.43	0.66	2.23***	0.62	.033*
	61	When I work in groups, we perform better with social media interaction	2.72***	0.57	2.50	0.69	.010**
	5	When my group members have a face-to-face meeting, we waste more time	2.51	0.72	2.27*	0.92	.027*
	1	Project demands require more virtual meetings than face-to-face meetings	2.19***	0.64	2.49	0.72	.002**
	39	Several virtual meetings are more effective than even one long face-to-face meeting	2.64*	0.73	2.35	0.74	.005**
	66	Face-to-face meetings typically take less time than virtual meetings.	2.24***	0.78	2.48	0.81	.034*
	65	Social media interactions help me to feel more comfortable with my group members	2.74***	0.63	2.35*	0.64	.000***
Process	16	Social media (e.g., Facebook, Instagram) are effective in building trust with group members	2.72***	0.65	2.48	0.76	.014*
	62	Social media interactions help me to get to know my group members better	2.78***	0.65	2.48	0.64	.001***
	47	Social media interaction improves group activities	2.91***	0.59	2.59	0.71	.000***
	44	Group members are more focused on a task during a virtual meeting.	2.60	0.68	2.21***	0.69	.000***
	57	I am more often bored or uninterested during virtual meetings than I am in face-to-face meetings	2.37*	0.71	2.65	0.73	.005**
	55	Social media interactions increase the exchange of ideas related to the group project	2.87**	0.65	2.56	0.71	.001**
	49	I gain more project-related information from virtual meetings than I do from face-to-face meetings	2.49	0.65	2.26**	0.67	.014*
	8	I am often more confused after virtual meetings than I am after face-to-face meetings	2.69**	0.68	2.43	0.77	.008**
	7	Social media interactions cause distraction from group work	2.38*	0.62	2.74**	0.72	.000***
	22	I remember more information from virtual meetings than I do from face-to-face meetings	2.66*	0.76	2.24**	0.78	.000***
Pre	19	I prefer to work in groups formed by the instructor	3.21***	0.58	2.12***	0.78	.000***

*** *p* < .001; ** *p* < .01; * *p* < .05; *n* ranges from 142 to 145 (Chinese) and from 79 to 82 (American).

Virtual and FTF Meetings. Chinese students, compared to students in the United States, indicate a significantly more positive experience with virtual interactions (see items 22, 49 and 66, in Table 3, above). Here, Chinese respondents, relative to their American counterparts, find they remember more, are neutral to gaining project-related information from, and FTF interaction does not take less time than virtual meetings. Item 44 shows that the U.S. sample finds people are not more focused during virtual meetings while the Chinese sample is neutral to this statement, indicating they are less negative to virtual meetings. Chinese respondents are also less negative than the Americans regarding boredom during virtual meetings (item 57, disagreement vs. neutral). A

consistent pattern emerges here: virtual meetings are experienced as more positive by Chinese students in their group projects than the American sample.

Two items (34 and 44) deal exclusively with virtual meetings and one item (5) deals only with FTF interactions. So, virtual meetings are described by the Chinese sample as being neutral in their impact on grades and focus. The American students respond quite differently. These responses strongly disagree with their Chinese counterparts and, instead, indicate that virtual meetings have no negative impact on grades and no positive impact on focus. Item 5 deals with wasting time during FTF meetings. The Chinese sample has a neutral response to whether time is wasted in FTF sessions, although the U.S. students indicate that there is a more definite conclusion here, namely, there is no negative impact of FTF interaction on this issue.

Social Media and FTF Interaction. Five items dealing with social media (see 61,16, 62, 47 and 55) indicate that the U.S. students' experience shows a neutral response to the impact on performance and trust building. The Chinese sample reflects a very different experience as it shows a significant level of agreement with each of these five statements. Social media play a more important and positive role in group relations for Chinese students than they do for their American counterparts. This finding is reflected even more strongly in items 65 and 7, since they indicate significant and opposite conclusions. Chinese respondents have positive views of social media in feeling more comfortable with their group members and not causing distractions, while American students disagree with both of these issues. Thus, the Chinese experience suggests that social media enhance personal interaction while the U.S. experience does not agree with this. Likewise, Chinese students find that social media provide a greater feeling of comfort with their group members, although the U.S. experience finds no such feeling. American students use direct FTF meetings as the major, perhaps sole, way to gain more comfortable feelings with group members and believe this to be enough in creating an effective group performance. Chinese students use social media along with FTF interactions to gain the same levels of comfort and performance.

DISCUSSION AND CONCLUSIONS

数字当地人 Digital Natives

We are surprised that digital natives come to these conclusions! These data suggest very strongly that both American and Chinese students find that FTF communication is the most effective mode of communication and results in the highest level of performance. As a result of this experience, both groups prefer FTF significantly over any form of technology-based communication. There are some significant differences, although the overall conclusion is unmistakable. Choi et al. (2018) found that technology-based interactions, to accomplish both goals of any group formation, namely, task completion and personal interaction, can be split into at least the two distinct categories of virtual and social media. The major difference between American and Chinese students is found in the use of the social media aspect of technology-based interaction. Specifically, while the Chinese sample found FTF to be more effective and satisfying than any technology-based process, they were significantly below the American sample in this finding. Moreover, the Chinese students apparently use social media to fill in any gaps they have with FTF to more fully reach the interpersonal goal of any group activity.

The Resulting Model

A consistent model is created by these results. Choi et al. (2018) suggest that U.S. respondents experience a strong reliance on FTF communication and this form of interaction results in the best performance and most desirable process of team member completion of group projects in classroom situations. The present study suggests that Chinese students likewise have the same basic experience in completion of group assignments in their university studies. The major difference seems to be: Chinese find that class group performance is a function of both FTF and social media communication while Americans note that this same performance is a function of FTF interaction alone. This general picture shows that U.S. students found FTF more effective than did the Chinese sample, and apparently, any deficiency was overcome by Chinese students with social media to gain additional intimate knowledge of their team members. Thus, Chinese respondents use social media to supplement the effects of FTF to reach both goals of task completion and social interaction, while American students found both goals were fulfilled solely by FTF interaction.

Country-based Differences

Chinese student experiences parallel what Choi et al. (2018) found with United States students, that group interaction develops two sets of activities to accomplish one or both of two goals: performance or on-task accomplishment; and, process or social/off-task fulfillment. Direct interpersonal interaction, for example, face-to-face collaboration, is intended to fulfill both of these goals. All forms of communication technology, as the basis of interaction, are intended to substitute for direct human collaboration while still fulfilling the same two goals. Our initial expectations include almost a one-to-one correspondence between technology-based communication and FTF. U.S. students determine that digital communication is not an adequate replacement for FTF in fulfilling either of these two goals (See, Choi et al., 2018). The Chinese students in the present study agree that technology-based communication tools do not adequately substitute for FTF in accomplishing on-task goals, consistent with the American respondents. They do find, however, that social media elements of digital interaction supplement, though do not replace, FTF in fulfilling the social/off-task aspect of group interaction.

Figure 1, below, describes the U.S. students' experience with and preference for both FTF and technology forms of communication. Heavy shading indicates the strong preference for FTF and much less preference for either form of technological communication, based on their experience with the three forms of interaction studied in this research (FTF, virtual meetings and social media).

Figure 1. U.S. Experience/Preference

Forms of Communication	FTF	High Performance/ Most Preferred	Highly Effective Interaction/ Most Preferred
	Virtual Meeting	Low Performance/ Least Preferred	Not Applicable
	Social Media	Not Applicable	Not So Effective Interaction/ Least Preferred
		Performance	Process
Goals of Group Interaction			

Likewise, Figure 2, below, shows what the Chinese student sample experiences and prefers the role to be of each form of communication in accomplishing the two goals of group interaction. Note how the shading of the FTF role in fulfilling the process goal of group activities is somewhat less than it is for the performance function. In addition, the shading for the role of social media is somewhat greater than that of virtual meetings. Looking at both Tables, therefore, we note that the U.S. students experience greater process success with FTF than do their Chinese counterparts while the Chinese sample experiences greater impact with social media than the U.S. sample.

Figure 2. Chinese Experience/Preference

Forms of Communication	FTF	High Performance/ Most Preferred	Effective Interaction/ Much Preferred
	Virtual Meeting	Low Performance/ Least Preferred	Not Applicable
	Social Media	Not Applicable	Somewhat Effective Interaction/ Somewhat Preferred
		Performance	Process
Goals of Group Interaction			

Trust (相信): Explanation for the Differences

Cultural differences help explain the variance between the need for and use of particular forms of communication in satisfying one or both of the goals of group interaction. The degree of collectivism or individualism is often cited as a general characteristic of societies (Taras, Kirkman, & Steel, 2010). China, for example, is described as a highly collectivist society while the United States is characterized as a highly individualistic country (see, Hofstede et al., 2010, for example). Delhey et al. (2011) note how the radius and level of trust vary across cultures. They indicate that China's high collectivism results in a very low radius of trust, that is, their in-group is only composed of family and close friends. Since group members are not typically included within their in-group, students require much more information about teammates before trust is sufficiently increased to include them. This explains their use of and reliance on social media to provide an additional source of personal information enhancing the basis for inclusion of peers within the in-group. Americans, because they have such a high level of individualism, begin with a much wider radius of trust and, as Lewis (2006) reminds us, maintain that trust until and unless the person becomes untrustworthy. Hence, many people are readily included as members of the in-group, including most of the team members. While the radius of trust is dramatically different between the U.S. and China, the level of trust is approximately the same for both cultures (Delhey et al., 2011). This notion of radius of trust helps explain why the Chinese students have a need to gain personal information about group members from sources in addition to FTF interaction. That is, a very narrow radius of trust indicates that Chinese students need to interact with their teammates on a more personal level and use social media as a supplement to FTF communication. In addition, they find the private interaction of social media more conducive to gaining this information than the more public forum of group FTF meetings. Students from the United States, with a very broad radius of trust, gather all the personal information they need solely from FTF interaction. After each sample reaches the appropriate level of trust to be comfortable, they can then attain their desired level of task performance.

Concluding Comments

Overall, Chinese and American students both prefer FTF over any kind of technology-based communication. In addition, both sets of experiences indicate FTF results in more effective outcomes in every area studied here. Differences identified throughout the data are culture-based. A Chinese student, for example, whose cultural background creates a very narrow radius of trust, needs to find additional sources of interpersonal knowledge before high levels of group and individual performance are achieved. The Chinese student, therefore, is focused on supplementing, not replacing, FTF communication to provide this desired level of intimate personal knowledge.

Implications

While designing group assignments, faculty often assume homogeneous student groups and may not pay enough attention to differences within them. However, as we found in this study, students with different backgrounds and cultures have different experiences and preferences regarding successful communication methods for group interaction and the need for additional sources of personal information to account for the initial radius of trust. Diversity is increasing in both universities and workforces. One of the main reasons we faculty use group assignments in class is

to help students be more effective and successful in the workplace. If faculty do not include potential influence of these differences in group interaction in the design of group assignments, we would not be able to achieve this goal.

Future Research. Our findings raise several questions and areas of additional data to be collected in future research. For example, more information is needed regarding different cultures and their impact on student preferences for and experiences with the different modalities of communication so faculty can create effective practices for group interaction in class. More information is also needed on all three forms of in-group exchanges (FTF, virtual and social media) by more direct comparisons between each/all of these communication approaches. Finally, just as cultural differences between a wider variety of cultures is desirable, so too, more country/culture comparisons in student uses of interaction modalities is recommended.

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