How formal and informal intercultural contacts in universities influence students' cultural intelligence?

Abstract

Along with rapid globalization, the ability to adapt and excel in an unfamiliar or diverse cultural setting becomes increasingly important. To meet the challenges, universities all over the world are committed to fostering an environment for students to develop their cultural intelligence (CQ). However, besides exchange programs and intercultural training, how students could benefit from day-to-day exposures to the multicultural environment on campus remain to be explored. This research underscores such need by investigating the path effects of formal and informal intercultural contacts to the development of students' CQ, based on a questionnaire survey in an internationalized university in Hong Kong. The findings reveal that, compared with formal contacts, intercultural contacts under informal settings such as interest group activities, room-mates or hall-mates, sports or other games have greater effects on students' CQ, especially on motivational and behavioral dimensions. Also, it was found that intergroup anxiety plays a mediating role only on the path from informal contacts to metacognitive CQ. The implications for university leaders and educators are further discussed in the article.

Keywords：Intercultural contacts; cultural intelligence; experiential learning

1. Introduction

Function effectively in cross-cultural settings is an essential competence for today's globalized world. The launch of the Belt and Road Initiative have created enormous job opportunities for graduates in Hong Kong to seek career success in an international job market. As a regional hub, Hong Kong tertiary education are motivated to meet this challenge by seeking effective ways to cultivate students' intercultural competence. Among the efforts in conceptualizing such competence, a multidimensional concept cultural intelligence (CQ) proposed by Earley and Ang (2003) is a relatively new concept and has received wide attention. Based on the contemporary view of multiple intelligence (Sternberg & Detterman, 1986), individuals with high CQ are more adaptive when entering an unfamiliar or multicultural environment; they can quickly gain cultural-specific knowledge and alter their behaviors and manners to adapt (Earley & Mosakowski, 2004). It has been verified that CQ is positively linked with expatriate adaptation (Yamazaki & Kayes, 2004), success in international business (Johnson, Lenartowicz, & Apud, 2006) and cross-cultural leadership effectiveness (Alon & Higgins, 2005; Ng, Van Dyne, & Ang, 2009).

Attention on CQ of university students starts from business schools since one of the educational goals for business-related programs is to prepare for cross-cultural and international tasks (Brancu, Munteanu, & Golet, 2016; Eisenberg et al., 2013; Falk-Bano & Kollath, 2016). Besides, current research revealed that CQ can predict international students' adaptation and their study performance abroad (Mokhothu &

Callaghan, 2018; Shu, McAbee, & Ayman, 2017). As an essential capacity, CQ is found significantly associated with students' social compatibility (Keyvanara, Yarmohammadian, & Soltani, 2014), foreign language ability and international orientations (Harrison, 2012). As CQ has been recognized being associated with better performance at school and afterward, pedagogical researchers endeavored in searching for effective interventions. Research findings indicate that intercultural training (Eisenberg et al., 2013), experiential learning activities (Kurpis & Hunter, 2017), and oversea exchanges (Brancu et al., 2016), are all, to some extent, leading to the improvement in students' CQ scores. The shortcoming of such measures is that only a limited number of students can be benefited, and only for a certain period. Among these efforts, little research has been carried out in examining how universities can utilize a culturally diverse environment on campus to create an intercultural learning space for every student.

Domestic students in universities share their learning and living spaces with an increasing percentage of international students. In Hong Kong, universities have a strong emphasis on internationalization, by enrolling students from all over the world (Lee, 2014). In and out of classrooms, students are exposed to intercultural contacts of different kinds, in a zone of diverse systems of language, customs, value, and beliefs. Whether these day-to-day cross-cultural contacts can be valuable sources for students' CQ development? According to the Experiential Learning Theory (ELT) by Kolb (1984), people learn from experiencing, reflecting, thinking, and interacting with the world around them. As supported by the Contact Hypothesis, intercultural contacts with

some specific conditions can reduce bias and prejudice, leading to the generalization of such interactions to other outgroup members (W. Allport, 1954). Also, it is argued that in intercultural education, authentic classroom settings are only efficient in delivering general knowledge of a particular culture, but can hardly teach students practical knowledge of "how-to-learn" or "how-to-adapt", nor bring any meaningful changes in behaviors (Bennett, 1986). It is reasonable to assume that the unpredicted and occasional intercultural experiences in universities can be an important supplement to universities' internationalization programs.

Intercultural contacts in universities occur on different occasions (Halualani, Chitgopekar, Morrison, & Dodge, 2004). Based on purposes and environments, they can be categorized into formal and informal types. In the formal settings, students interact with each other for academic purposes, which mostly occur under disciplines and guidance, such as classroom discussions, group assignments, and seminars. While intercultural contacts also occur in an informal form, with more random purposes and dynamic environments, including hanging out with friends, joining student clubs, living with foreign roommates, participating in extra-curricular activities, and interacting on social media. Without talking about conditions, intercultural contacts can either increase or decrease anxiety levels, leading to a reduction of prejudice or increased tensions and stereotypes towards outgroups (C. W. Stephan & Stephan, 1992). Considering the potential effects of intercultural contacts on CQ development, limited research has been carried out to examine how different types of intercultural contacts brings changes to students' CQ. The research addressed this gap by an empirical survey

among the undergraduate students in one of the eight UGC-funded universities in Hong Kong. The findings and implications are valued for educators and decision-makers to have a better understanding of students' learning outcomes from intercultural contacts, as well as promote environmental changes in universities to facilitate students' CQ development.

2. Theoretical Framework and Hypothesis Development

2.1 Four dimensions of CQ

Earley and Ang (2003, p. 9) define CQ as "a person's capability for successful adaptation to new cultural settings, that is, for unfamiliar settings attributable to cultural context." The concept explains why some people have the instinct to adapt to a new culture more easily, quickly, and thoroughly than others. Compared with the general emotional or social intelligence such as empathy, knowledge of social matters, the ease with people, and insights concerning others (Bar-On, Tranel, Denburg, & Bechara, 2004; Mayer & Geher, 1996), CQ specially predicts adaptation in cultural contexts and such ability can sustain across cultures (Earley & Mosakowski, 2004).

According to Earley and Ang (2003), CQ is a reflective concept that contains four different facets including meta-cognitive, cognitive, motivational, and behavioral dimensions. Instead of a "toolkit" of skills and knowledge, CQ is a multi-dimensional competence encompassing from "how to learn from new cultural encounters" to "how to behave to adapt" (Johnson et al., 2006). Metacognitive and cognitive CQ are the

fundamental processes to learn and acquire the cultural-specific knowledge. Cognitive basis means the knowledge individuals possess about the structures of norms, practices, and conventions of other cultures. Metacognition is a higher level of cognition. Individuals with high metacognitive CQ can consciously detect and control the values and rules of how they could learn from the environment. With cognitive and metacognitive CQ, individuals could efficiently understand and learn the differences across cultures. Motivational CQ, as an attitudinal attribute, reflects one's intrinsic will to engage in an unfamiliar culture. Individuals with high motivational CQ are more willing to study/work abroad, live in multicultural communities, and exposed to cross-cultural challenges. Behavioral CQ is the ability to consciously change actual behaviors in order to adapt to the cultural settings.

The four distinct but interrelated dimensions constitute the concept of CQ. It located at both internal intellection of a person and the actual adaptation and functioning in a new or diverse cultural environment. As different bases of CQ, the dimensions also lead to various aspects of intercultural effectiveness. According to the empirical results of Soon et al. (2007), metacognitive and cognitive CQ can predict cultural judgment and decision making; Motivational and behavioral CQ are positively related to adaptation; Metacognitive and behavioral CQ predict task performance.

As for higher education, CQ is a measurable concept to evaluate students' profile of intercultural competence. It was found from a survey in Romania that university students' motivational and metacognitive CQ are relatively high, but with limited

knowledge nor actual behavior changes as needed for adaptation (Brancu et al., 2016). Also, among all the dimensions, cognitive and motivational CQ have been found significantly associated with international students' adaptation (Mokhothu & Callaghan, 2018; Shu et al., 2017). Considering the multi-dimensional feature of the concept, there is a need to empirically test how the four dimensions of CQ are developed by university students.

2.2 Intercultural contacts

Intercultural contacts refer to communications, interactions, or relationships between individuals from two or more culturally different backgrounds, including countries, ethnicity, companies, or other socially constructed groups. Research on intercultural contacts is originated from ethnic studies from the 1950s, when Contact Hypothesis is conceptualized suggesting that positive contact experiences can help to reduce psychological bias and prejudice towards outgroup as a whole (Amir, 1976; W. Allport, 1954). It should be noted that there are several prerequisite conditions in Contact Hypothesis, including equal status, cooperative interdependence, common goals, supportive norms, personal interaction, and friendship opportunity (Dovidio et al. 2003). As a way to lower intergroup tensions, intercultural contacts have been extensively tested to be associated with reduced prejudice and stereotypes in many different fields (Pettigrew & Tropp, 2006)

In higher education institutions, demographic diversity does not always create intercultural contacts (Lantz-Deaton, 2017), nor directly contribute to students'

intercultural competence (Halualani et al., 2004). Despite the increasing percentage of international students, the frequency of interactions between domestic and international students are reported at a low level (Williams and Johnson, 2011; Volet & Ang, 2012). Based on existing research, intercultural contact is found associated with many favorable outcomes, including students' cultural adaptation (Mokhothu & Callaghan, 2018), intercultural attitudes (Tawagi & Mak, 2015), as well as future educational and career development (Jon, 2013). Among those efforts, limited attention has been focused on students CQ changes accumulated from the interactions.

Intercultural contact offers a site where subjects shift external evaluation of cultural others to inner experiences and reflections of intercultural differences (Holmes & O'Neill, 2012). When students step into the contact zone and be exposed to different cultures, norms, beliefs, they can grasp the experience, reflect on it, transform to rules, and use these rules as a guide for future adaptations. Skills and abilities for intercultural communication are gradually developed through the spiral of the iterative experiential learning process. Therefore, experiential learning approaches such as field experiences (Miranda, 2014), immersive experiences in another culture (Crowne, 2013), and role play (Kurpis & Hunter, 2017) have been advocated as effective approaches in students CQ development.

Although previous research has not clearly separated formal and informal settings, some researchers posited that the contexts that intercultural contacts occur can affect the outcomes (Tawagi & Mak, 2015). Besides extensive research on formal curriculum,

the significance of learning under informal environments while studying in universities has been widely recognized (Alekseeva, Shaidullina, Lipaev, Sadykova, & Sgem, 2015; Lai & Smith, 2017, 2018). Compared with authentic classes, informal self-oriented learning from daily lives is taken as an effective source for the acquisition of a foreign language (Bahrani, Sim, & Nekoueizadeh, 2014). Also, peer interactions under informal environment increase the sense of belonging of international students, leading to higher academic performance (Meeuwisse, Severiens, & Born, 2010). To further understand the complex effects of intercultural contacts, there is a need to separate formal and informal settings and test the differences in experiential learning outcomes.

2.3 Intercultural anxiety

According to Contact Hypothesis, anxiety is a critical factor in moderating the relation between intercultural contacts and bias (Pettigrew, 1998; Pettigrew & Tropp, 2006). Compared with in-group interactions, intercultural contacts are characterized by uncertainty and unpredictability. Intercultural anxiety is a tension, an emotional unease, experienced by people who are about or interacting with members from other cultural groups (Walter G. Stephan & Stephan, 1985). It is mainly caused by the expectations for the negative psychological or behavioral consequences of intergroup contacts, generated from past experiences, stereotypes, linguistic barriers, or personalities (W. G. Stephan, 2014). Anxiety can also increase perceived uncertainties and reduce subjects' willingness to interact with members from other cultures (Samochowiec & Florack, 2010).

Among educational studies, anxiety is found as one of the most important factors that impact the intercultural acquaintance in universities (Dunne, 2009). Anxiety and negative communication emotions are both found negatively related to students' intercultural contacts and attitudes (Mak et al., 2014). It has been found that among host students who have intercultural contacts, anxiety was frequently mentioned due to the fear of unintentional offense perceived by international students or being mocked by host student groups (Dunne, 2009). According to the model of Gao and Gudykunst (1990), management and reduction of anxiety is the key to successful cultural adjustment.

Besides as a hindrance for intercultural contacts, we argue that intercultural anxiety would impede students' experiential learning of cultural knowledge and adaptive rules. Kolb (1984) describes the experiential learning process as a circle of four stages including concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE). People who experience anxiety would be reluctant to expose to intercultural contacts to avoid cultural shocks or negative emotion of feeling unaccepted (Logan, Steel, & Hunt, 2015). At the same time, anxiety can cause bias in information processing, then would lead to intensified self-awareness and stereotypes (Gudykunst, 1998; Walter G. Stephan & Stephan, 1985). Further, intercultural anxiety lowers the possibility of further engagement with outgroup members and lead to the absence of a trial-and-error process. Based on the discussion above, we argue that intercultural anxiety is a negative mediator between the relation of intercultural contacts and CQ.

2.4 Development of the theoretical framework

Table 1 shows the variables that constitute the theoretical framework. Except for the primary constructs under test, we also controlled some disturbance factors may confound with the variance of the primary constructs to avoid erroneous judgments. From reviewing the literature, we found that demographic variables and personal traits are the main predictors for CQ and intercultural contacts. The demographics that may influence the focused constructs were taken into consideration including age, gender, major, originality, and the year of study. Personal traits including self-efficacy and openness were included to avoid the possible disturbance on the target constructs (Ang, Dyne, & Koh, 2006; MacNab & Worthley, 2012). Also, we controlled the social desirability of the respondents to avoid personal bias.

Table1 Variables constituting the conceptual framework

Category		Variables
Constructs under examination	Independent variables	Formal intercultural contacts (FIC); Informal intercultural contacts (IIC)
	Mediating variable	Intercultural anxiety (IA)
	Dependent variables	Metacognitive CQ (MCCQ); Cognitive CQ (CCQ); Motivational CQ (MCQ); and behavioral CQ (BCQ)
Confounding constructs	Control variables	Demographics (age, gender, major, originality, year of study) Personal traits (self-efficacy, openness, social desirability)

Based on the above discussions, two main hypotheses were aimed to be tested in the conceptual framework (Figure 1). First is the direct effects of formal and informal

intercultural contacts on students' development of four facets of CQ. Second is the mediating effect of intercultural anxiety on the relation between intercultural contacts and CQ. Besides, because the relationships between the three primary constructs are complex, we cannot only look at a single framework induced from one theoretical perspective. The cause of changes in intercultural contacts frequency may be the development of CQ or the decrease in anxiety. Also, the influences of intercultural anxiety can also be multiple. Alongside the verification of the proposed framework, we also tested several alternative frameworks to compare the explanatory power, including 1) reversing all the path directions, 2) taking intercultural anxiety as a moderator, 3) taking intercultural anxiety as a confounder.
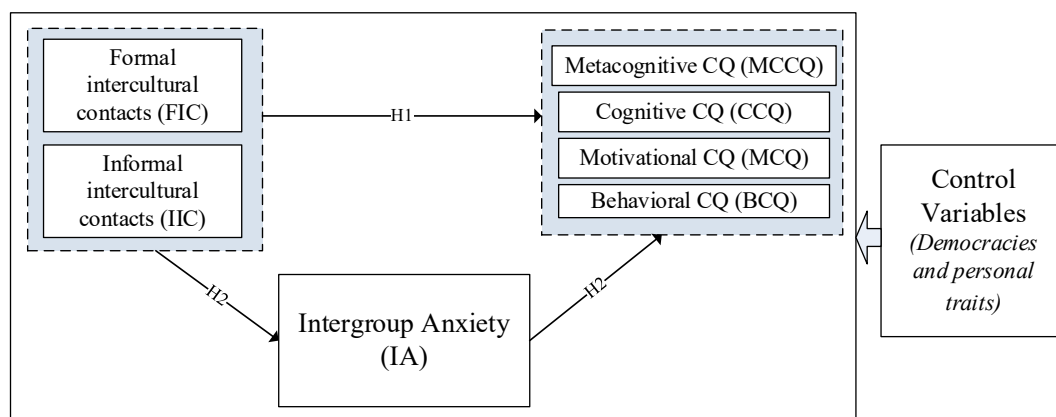

Figure 1 the conceptual framework

The hypotheses developed in this research are as follows:

Hypothesis 1: Both formal and informal intercultural contacts in universities have positive impacts on the development of student' four facets of CQ.

Hypothesis 1a: FIC has a positive impact on MCCQ

Hypothesis 1b: FIC has a positive impact on CCQ

Hypothesis 1c: FIC has a positive impact on MCQ

Hypothesis 1d: FIC has a positive impact on BCQ

Hypothesis 1e: IIC has a positive impact on MCCQ

Hypothesis 1f: IIC has a positive impact on CCQ

Hypothesis 1g: IIC has a positive impact on MCQ

Hypothesis 1h: IIC has a positive impact on BCQ

Hypothesis 2: Intercultural anxiety perceived by students is a mediator between intercultural contacts and the development of four facets of CQ.

Hypothesis 2a: FIC has a negative impact on IA

Hypothesis 2b: IIC has a negative impact on IA

Hypothesis 2c: IA has a negative impact on MCCQ

Hypothesis 2d: IA has a negative impact on CCQ

Hypothesis 2e: IA has a negative impact on MCQ

Hypothesis 2f: IA has a negative impact on BCQ

3. Research methods

3.1 Sampling and data collection

To test the hypotheses, a structured questionnaire survey was conducted among undergraduate students in one of the eight universities funded by UGC (University Grant Committee) in Hong Kong. The instruments were designed and translated in

English, Traditional Chinese, and Simplified Chinese. A pilot study was conducted among a small group of students from different cultural and lingual backgrounds to test the face validity. The questionnaire was revised and improved based on their comments. Considering the large size of the total population and the operational constraints, convenience sampling was adopted in this study (Etikan, 2016). To alleviate potential bias or misrepresentation, the implementation of the data collection addressed the diversity of sample in terms of major, cultural backgrounds, year of study, and other demographic characteristics.

The formal survey was conducted from November 2017 to February 2018. We invited respondents from the students who participated in an intercultural teaching and learning program at the university. Due to the cultural and lingual dissimilarity, during and out of classes in the university, students are usually grouped by Mainland Chinese, Hong Kong Local, and international students (whose originality and cultural backgrounds are neither Mainland China nor Hong Kong). The teaching and learning program involved students of different originality from eight faculties for forming into intercultural teams and working on group-based projects. To access to more non-local students, data collection was also carried out in one of the student halls of residence in the university. At last, the valid sample size obtained was 109, with a response rate of 62.3%. Compared with random sampling techniques, convenience sampling has its limitations in the generalization of the findings. However, limited resources can be optimally utilized to obtain a sample with preferred characteristics. Instead of seeking broad generalization, it is the tendency of how day-to-day intercultural exposures affect the

development of CQ that was aimed to be explored in the study.

Table 2 describes the demographic characteristics of the sample. It shows that the respondents spanned from the first to final year across eight different faculties. The numbers of respondents were nearly balanced in gender. Also, the sample addressed the diversity of different groups by including 31.2% Hong Kong locals, 43.1% Mainland Chinese, and 25.7 % international students. The data was then recorded for further data analysis.

Table 2 demographic information of the respondents

Variable	Category	N	Percentage
Year	Year 1	34	31.2
	Year 2	31	28.4
	Year 3	27	24.8
	Final Year/Year 4	17	15.6
Major	Applied Science and Textiles	12	11.0
	Business	17	15.6
	Construction and Environment	13	11.9
	Design	10	9.2
	Engineering	14	12.8
	Health and Social Sciences	13	11.9
	Hotel and Tourism Management	16	14.7
	Humanity	14	12.8
Gender	Female	48	44.0
	Male	61	56.0
Group	Hong Kong Local	34	31.2
	Mainland China	47	43.1
	International	28	25.7
Age	18 to 20	72	66.1
	21 to 25	27	24.8
	Over 26	9	0.1

Note: valid sample size is 109; there is one missing value for age

3.2 Measurements

To test the relationships, observable indicators to measure the latent constructs under test were developed. The framework contains both formative and reflective constructs. Formal and informal intercultural contacts are formative constructs. Several common circumstances of intercultural contacts on campus were used as indicators. Respondents were asked to evaluate the frequency of each circumstance that they have had by using a seven-point Likert scale. Formal contacts include classroom discussions, seminars or academic event, and group assignments. Informal contacts include interest group activities, room-mates or hall mates, sports or other games. In the questionnaire, the respondents were also asked to evaluate their levels of anxiety under these circumstances when interacting with students or teachers from other cultures compared with interacting with someone from their own culture. We used a group of terms describing affective status to evaluate anxiety, such as "do you feel more or less certain, awkward, self-conscious, happy, accepted, confident, irritated, impatient, defensive, suspicious, and careful when interacting with students from other cultures." These terms are based on the theory of intergroup anxiety by Walter G. Stephan and Stephan (1985). The items for measuring the development of four components of CQ constitute the central part of the questionnaire. They were extracted from the overall 20-item CQ scale developed based on the work of Ang et al. (2006). This CQ scale has been well established and validated, as one of the approaches to evaluate intercultural competence (Matsumoto & Hwang, 2013). In the questionnaire, respondents were asked how much development they have gained on each item since the study in the university.

Age and gender (male=0; female=1) of the respondents were also asked in the questionnaire. In the university under investigation, students from business-related majors (Business School and School of Tourism and Hotel Management) have compulsory cross-cultural management courses in their curriculum from the first year, so we also control business and non-business major as confounding variables that may lead to a false conclusion on the hypothesized relationships (business-related =0; nonbusiness=1). The groups that respondents belonged to (Mainland=0; HK=1, International=2) and the year of study were also evaluated as the control variables.

Besides, there are three latent constructs in the control variable group, including self-efficacy, openness, and social desirability. Self-efficacy was measured by the Generalized Self-Efficacy Scale developed by Schwarzer, R., & Jerusalem, M. (1995). As for openness, instead of using the traditional five big personality scale, we extract five questions from the Attitudinal and Behavioral Openness Scale (ABOS) developed by Caligiuri, Jacobs, and Farr (2000). There are many well-validated scales for measuring social desirability. In this research, a four-item short scale developed by Haghighat (2007) was employed to avoid the fatigue of respondents when answering a long list of questions bearing similar connotations.

3.3 Data analysis

The research employed partial least square structural equation modeling (PLS-SEM) for examining the hypothesized relationships between latent constructs. PLS-SEM is a useful method to verify theoretically supported linear and additive casual models.

Developed by Ringle, Wende, and Will (2005), SmartPLS is a highly rated tool for PLS-SEM. It has accepted growing popularity since launched, especially in marketing and management research, due to its user-friendly interface and powerful report outputs (Wong, 2013). Compared with covariance-based structural equation modeling (CB-SEM) that mainly focusing on analyzing structures between observables, PLS-SEM is more suitable for testing a prediction model and identifying key predictors for dependent variables (Hair, Ringle, & Sarstedt, 2011). Also, compared with CB-SEM, PLS-SEM has a substantial advantage for analyzing models of mixed formative and reflective constructs, and with a higher tolerance for a small sample size (Chin & R. Newsted, 1999). We chose PLS-SEM as an appropriate method since the model under test is prediction-oriented, involving both formative and reflective constructs, and with a relatively small sample.

4. Results and findings

4.1 Measurements validity and reliability

Before examining the structural model, the reliability and validity of the construct measures were evaluated. For the two formative constructs, the reliability and validity of FIC and IIC are based on differentiated evaluative measures from the reflective constructs (Joe, Marko, Lucas, & Volker, 2014). From table 2, only one indicator FIC_GA has an insignificant outer weight of 0.116. However, its loading is significant with a T-value of 6.193. According to Wong (2013), the indicator should only be removed when the outer weight and loadings were both insignificant. The collinearity

of the indicators for FIC and IIC was also checked, showing that the VIF values are lower than 5 and tolerance values are higher than 0.2 for all of the indicators.

For the reflective constructs, composite reliability (CR) is proposed as a better measure for evaluating internal consistency reliability in PLS-SEM compared with Cronbach's Alpha (Joe et al., 2014). From Table 3, it shows that the CR of all reflective constructs are higher than 0.6, which demonstrate high levels of internal consistency reliability. The validity of the model was assessed by convergent and discriminant validity. Convergent validity means the measures for the same constructs should be related to each other. The results show that the outer loadings of all indicators of the represented constructs are significant and above the acceptable level of 0.4, most of which are higher than the preferable level of 0.7. Also, the average variance extracted (AVE) of all the constructs exceed the threshold of 0.5, indicating the constructs explain more than half of the variance of its indicators. Thus, the convergent validity of the constructs is well established in this research. Discriminant validity represents whether the construct is empirical dissimilar from other constructs. Referring to the Fornell and Larcker (1981) criterion, the square roots of AVE of each construct (bold values in the diagonal of Table 4) are higher than the correlation values with other constructs, suggesting the discriminant validity is well established too.

Table 3 measurement items and loadings

Constructs	Indicators	Mean	SD	Weights/loadings	T-value	CR	AVE
FIC	FIC_CL	4.66	1.673	0.529	3.224		
	FIC_CN	4.17	1.539	0.582	4.366		
	FIC_GA	4.60	1.821	0.116	0.685		

						CR	AVE
IIC	IIC_ICA	4.36	1.590	0.515	6.094		
	IIC_SG	4.60	1.645	0.420	4.466		
	IIC_SH	4.77	1.709	0.292	2.548		
MCCQ	MCCQ1	4.94	1.104	0.845	26.600		
	MCCQ2	5.05	1.294	0.780	13.969	0.871	0.628
	MCCQ3	4.93	1.238	0.806	22.986		
	MCCQ4	4.93	1.345	0.734	14.368		
CCQ	CCQ1	4.33	1.354	0.735	11.559		
	CCQ2	4.10	1.427	0.820	22.854		
	CCQ3	4.67	1.368	0.850	29.262	0.917	0.649
	CCQ4	3.83	1.494	0.756	14.510		
	CCQ5	4.20	1.551	0.826	25.161		
	CCQ6	3.98	1.509	0.840	28.678		
MCQ	MCQ1	5.71	1.242	0.778	18.474		
	MCQ2	5.07	1.331	0.834	26.266		
	MCQ3	5.20	1.268	0.885	40.112	0.924	0.709
	MCQ4	4.99	1.469	0.872	43.269		
	MCQ5	4.93	1.260	0.837	23.958		
BCQ	BCQ1	5.26	1.315	0.863	23.423		
	BCQ2.	4.94	1.293	0.826	16.228		
	BCQ3	5.28	1.235	0.857	19.442	0.920	0.699
	BCQ4	5.15	1.373	0.875	33.799		
	BCQ5	4.95	1.329	0.753	10.545		
IA	IA1	2.69	1.372	0.817	16.347		
	IA2	2.78	1.480	0.741	10.978		
	IA3	3.14	1.424	0.844	28.126	0.915	0.643
	IA4	2.85	1.477	0.837	29.236		
	IA5	3.14	1.691	0.740	13.075		
	IA6	2.94	1.666	0.826	23.277		
OP	OP1	4.76	1.948	0.721	10.139		
	OP3	4.75	1.617	0.636	7.051	0.799	0.500
	OP4	4.59	1.657	0.725	9.397		
	OP5	4.53	1.525	0.739	12.195		
SD	SD1	4.27	1.676	0.734	8.870		
	SD2	5.08	1.241	0.806	10.466	0.816	0.529
	SD3	4.73	1.176	0.776	9.107		
	SD4	5.09	1.309	0.573	4.491		
SE	SE1	4.94	1.079	0.758	15.152		
	SE2	5.08	1.098	0.657	10.027		
	SE3	4.84	1.172	0.837	22.427	0.914	0.640
	SE4	4.84	1.156	0.785	16.761		
	SE5	5.01	1.041	0.873	38.322		
	SE6	5.27	1.006	0.867	27.368		

Note: SD=standard deviation; CR=composite reliability; AVE=average variance extracted

Table 4 correlations of the latent variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.Formal intercultural contacts (FCC)	1.00														
2.Informal intercultural contacts (ICC)	0.46	1.00													
3.Metacognitive CQ (MCCQ)	0.26	0.57	**0.79**												
4.Cognitive CQ (CCQ)	0.47	0.50	0.32	**0.81**											
5.Motivational CQ (MCQ)	0.55	0.76	0.45	0.62	**0.84**										
6.Behavioral CQ (BCQ)	0.39	0.65	0.45	0.56	0.74	**0.84**									
7.Intergroup anxiety (IA)	-0.35	-0.52	-0.57	-0.31	-0.49	-0.36	**0.80**								
8.Openness (OP)	0.57	0.44	0.27	0.55	0.58	0.53	-0.33	**0.71**							
9.Social desirability (SD)	0.17	0.32	0.34	0.19	0.36	0.40	-0.25	0.13	**0.73**						
10.Self-efficacy (SE)	0.36	0.46	0.69	0.38	0.44	0.45	-0.56	0.30	0.36	**0.80**					
11.Age	0.10	-0.04	0.05	-0.12	-0.06	0.04	0.04	0.06	0.18	0.15	1.00				
12.Gender	-0.02	0.08	-0.06	-0.02	0.23	0.08	-0.04	0.04	0.09	-0.12	-0.07	1.00			
13.Major	0.08	0.26	0.10	0.14	0.21	0.15	-0.09	0.21	-0.04	0.03	-0.27	-0.14	1.00		
14.Group	0.22	0.24	0.17	-0.05	0.18	0.13	-0.12	-0.03	0.18	0.06	0.12	0.15	-0.11	1.00	
15.Year of study	-0.03	-0.11	-0.17	0.03	-0.14	-0.15	0.08	-0.02	-0.20	-0.08	0.16	0.16	-0.08	-0.11	1.00

Note: the bold values on the diagonal are the square roots of AVE

4.2 Hypotheses testing

Figure 2 shows the results of the hypotheses testing by PLS-SEM. The R^2 (coefficient of determination) represents the model's prediction accuracy on the endogenous variables. The results report that the R^2 values of metacognitive, cognitive, motivational, and behavioral CQ are all substantially high, suggesting that a large percentage of the variance in CQ can be explained by the model. The noticeable higher R^2 of MCQ represents the model can predict around 72.6% of the changes of motivational CQ. Before looking at the path coefficients, a bootstrapping with 5000 subsamples was performed for significance testing. The results were also shown in Figure 2.
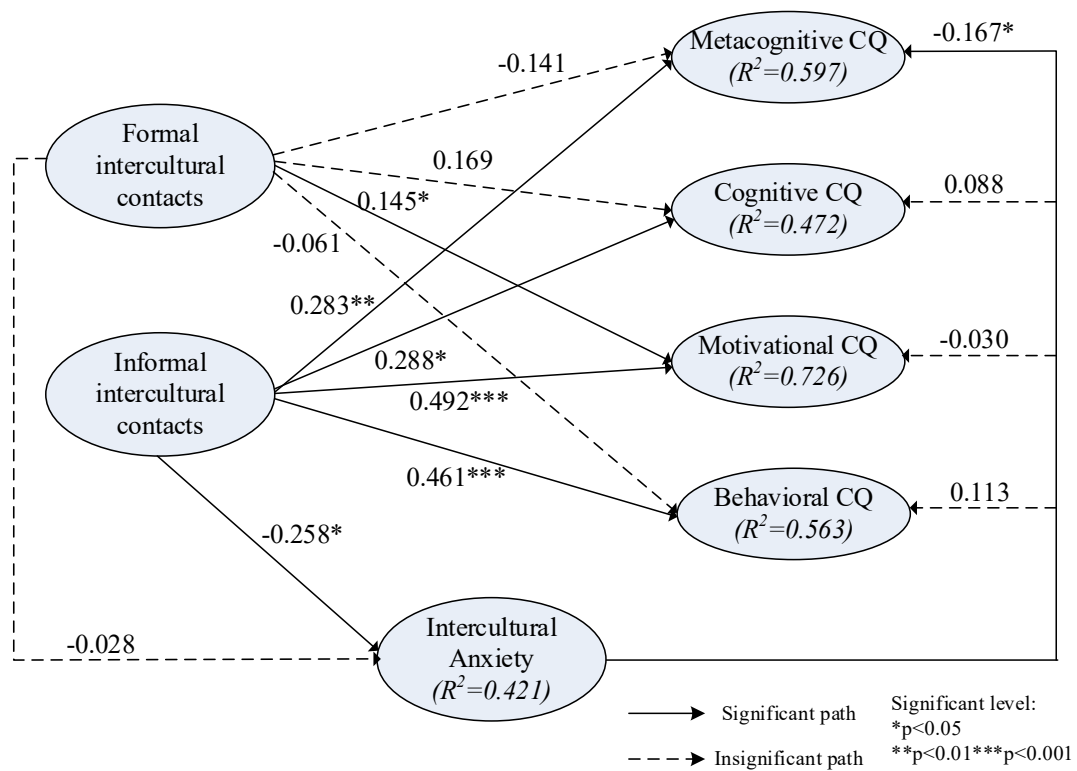

Figure 2 results of the PLS-SEM analysis

Note: for the clarity of presentation, the control variables were not depicted in the figure, including respondents' age, gender, major (business and non-business related), group (Mainland China, Hong Kong local, and international students), year of study, self-efficacy, openness, and social desirability.

Direct effects of intercultural contacts

The first step of the analysis is to test the direct effects of intercultural contacts on students' CQ. Hypothesis 1 is partially supported. IIC is significantly related to all the four facets of CQ (H1e, H1f, H1g, H1h are supported), while FIC is only significantly related to MCQ (H1c is supported; H1a, H1b, H1d are not supported). As shown in Figure 2, the positive links of IIC with MCQ (β=0.492, p<0.001) and BCQ (β=0.461, p<0.001) are substantial, suggesting a strong influence of informal contacts on students' attitudes and behavioral changes. Besides, the results also show a strong positive link between IIC with MCCQ (β=0.283, p<0.01) and CCQ (β=0.288, p<0.05). Compared to IIC, FIC shows limited predictive power on students' CQ development. Most of the direct paths between FIC and CQ are found insignificant (p>0.05), except for one significant link between FIC and MCQ (β=0.145, p<0.05).

Mediating effects of intergroup anxiety

Next is to verify the mediating role of intergroup anxiety. Hypothesis 2 is partially supported by the significant path coefficient between IIC and IA (β=-0.258, p<0.05), suggesting IIC leads to the reduction of IA. Meanwhile, IA is negatively associated with MCCQ (β=-0.167, p<0.05). Only H2b and H2c are supported by the data, while H2a, H2d, H2e, H2f are not supported. The authors calculate the PLS algorithm of both models with and without IA; it shows the inclusion of IA decrease the path coefficients between intercultural contacts and CQ, which means IA has a mediating effect between the causal relationships. The mediating role of IA represents that there is a part of the influence between intercultural contacts and CQ was contributed by the decrease of IA during the experiences.

Effects of control variables

There are also some noteworthy significant links between control variables and the key constructs in the framework. Gender has a significant positive relation with MCQ (β=0.190, p<0.01), showing a difference of motivations among male and female students. There is also a significant link between Major and IIC (β=0.207, p<0.01), indicating that business-related major students have more chances to contact with other cultures informally, this may be due to the high proportion of international students in the departments. The link between Group and FIC is also significant (β=0.235, p<0.01), showing students from Mainland China, HK local, and international groups have a significant difference in intercultural contacts frequency in classes. Apart from the demographics, personality traits are also correlated with the constructs under concern. Openness has significant link with MCQ (β=0.236, p<0.01), CCQ (β=0.327, p<0.01), and BCQ (β=0.327, p<0.01), as well as with FIC (β= 0.521, p< 0.001) and IIC (β=0.286, p<0.01). Self-efficacy is significantly related to IA (β=-0.424, p<0.001) and MCCQ (β=0.488, p<0.001), as well as with FIC (β=0.191, p<0.05) and IIC (β=0.331, p< 0.001).

4.3 Test of alternative frameworks

Several alternative frameworks were performed by changing the relations among the key constructs to test the explanatory power of the proposed framework. Table 5 shows the results of testing the three alternative frameworks. The first one is to reverse all the path directions by pointing from CQ to FIC and IIC, with the reverse mediating effects of intergroup anxiety. The results of the PLS algorithm show the R^2 were lower than the theoretical framework we presented and most of the path coefficients were insignificant (the paths from CQ towards FIC and IIC, and the paths from IA to FIC). As in the second alternative model, we treated IA as a moderating variable that moderates the

direct relationships between intercultural contacts and CQ. The predictive accuracy of the model decreased, and all the moderating effects were not significant. In the last alternative framework, we treated IA as a confounding variable that is related to both dependent and independent variables, which may falsely obscure the statistical relationship between them (MacKinnon, Krull, & Lockwood, 2000). The results showed that the R^2 of CQ dropped, and most of the links became insignificant. Compared with the alternative frameworks, the pathways from intercultural contacts to CQ, mediated by IA, as presented in this article, has higher explanatory power.

Table 5 results of alternative framework testing

	R^2							Significant paths[1]
	FIC	IIC	IA	MCCQ	MCQ	CCQ	BCQ	
Proposed framework			0.421	0.597	0.726	0.472	0.563	FCC->MCQ* IIC->MCCQ** IIC->CCQ* IIC->MCQ*** IIC->BCQ*** IIC->IA* IA->MCCQ*
Alternative framework I	0.398	0.485	0.461					ECQ->IA* MCCQ->IA* IA->IIC*
Alternative framework II				0.545	0.691	0.392	0.526	IIC->BCQ*** IIC-CCQ** IIC->MCQ*** IIC->MCCQ**
Alternative framework III	0.398	0.485		0.508	0.537	0.338	0.419	IA->IIC* IA->MCCQ**

[1]*The paths not mentioned are all insignificant.*

5. Discussions

This research explored in which and what types of circumstances, the "experiencer" can transform more from concrete intercultural contacts experiences into knowledge and skills for cross-cultural effectiveness. As a supplement to the understanding of how

students can develop their intercultural competence from daily contacts in universities, we established and tested a model for verifying the effects of formal and informal intercultural contacts on students' development of CQ. The findings show that informal contacts, such as activities of interest clubs or student associations, sports or other games, and student hall-mates or roommates, have significant influences on the development of students' four facets of CQ. While formal intercultural contacts, including classroom discussions, group assignments, and seminars or workshops are only significantly associated with motivational CQ. It is plausible to argue that, compared with formal settings under academic purposes and disciplined environment, the casual, comfortable, and relaxed contacts under informal settings are more effective for students' CQ development.

The superior effectivity of informal contacts can be explained by unformatted environments, which produce more chances for unexpectations to occur. The argument is supported by Rosenblatt, Worthley, and MacNab (2013), who posit that disconfirmation of expectations is indispensable for developing CQ from the optimal perception of contacts. For experiential learning process, the "shock" and "stuck" of strangeness out of our usual experience are the key triggers, as described by Kolb (1984), to transform concrete experiences to reflective observations. According to him, experiential learning is a conflict-resolution process, in which the reflective process initiated by leaners is fundamental. In a formal form of intercultural contact, communications and interactions have a specific context and purpose, such as a particular discussion or assignment topic, which constraint the possibilities for the culturally different behaviors and potential conflicts to occur. If the information people received can be well explained in their own culture, they tend to act in their habitual way instead of reflecting on the situations, according to Bhawuk, Sakuda, and

Munusamy (2008). Therefore, informal contacts provide a space for unexpected situations to happen, when students have to change their familiar patterns and notice cultural-specific rules to guide their future adaptation. Because of these expected unexpectations, informal contacts have a stronger association with the development of the four facets of CQ compared with formal contacts.

The results reveal the most substantial direct effects of informal intercultural contacts are on motivational and behavioral CQ. Besides, formal contacts also take a moderate effect on motivational CQ. This finding support Contact Hypothesis that positive intercultural contacts could lead to the generalization of contact with outgroup members with an increased willingness for interactions (W. Allport, 1954). Also, it corroborates with Rosenblatt et al. (2013) that learning from cultural experiences can lead to the development of motivational, especially behavioral CQ.

Compared with formal environments, informal settings have a characteristic of less power hierarchy, less institutionalization, and more learner-centered environment, which can increase students' sense of autonomy. Referring to the self-determination theory by Niemiec and Ryan (2009), human are inherently curious and eager to build up relationships and assimilate into a community, which generates the autonomous motivation to gain competencies internalize social knowledge around them. It is found that students have better learning outcomes by teachers who use autonomous supportive rather than controlling strategies (Vansteenkiste, Zhou, Lens, & Soenens, 2005). Although informal settings are more helpful for inspiring students' autonomous motivations, both types of intercultural contacts can provide opportunities for students to experience optimal exchanges and build up confidence and willingness for future cultural encounters.

Behavioral CQ is very crucial for successful adaptation in a new culture, with which individuals can alter their behaviors to present themselves in a favorable manner (Earley & Mosakowski, 2004). Our findings show that only informal intercultural contacts have positive impacts on behavioral CQ. Informal settings provide a field environment for students to learn how to behave effectively across cultures through observing, mimicking, and experimenting, which is proved to be the best way to learn behavioral skills for adaptation.

Besides, informal intercultural contacts also show significant effects on cognitive and metacognitive CQ, while formal interactions do not. These two facets of CQ constitute the fundamental basis for individuals to interact and adapt in a new or multicultural environment. Cognitive process decides how individuals process, categorize, and store information from surrounding environments, using which to determine what actions they would take to react to the situations. Meta-cognition can be considered as "high-order" intelligence, which means thinking and understanding about one's own cognition process (Hacker, Dunlosky, & Graesser, 1998). It related to the self-regulation ability to control one's learning cycle (Veenman, Van Hout-Wolters, & Afflerbach, 2006). The lack of emphasis on this aspect in intercultural training has long been criticized that only focusing on "skills" is not enough, the students should also learn about the "theory to learn" (Bennett, 1986). It has been proved in previous research that both cognitive and metacognitive capacity can be developed through external training interventions (Jaeggi, Buschkuehl, Jonides, & Shah, 2011). This research supplements the statement that these skills can also be acquired from incidental learnings during interpersonal contacts. During communicating and interacting with people, individuals gain cultural-specific knowledge, comprehend the differences confronted in cross-cultural situations, and learn how their brains operate to process the information to transform into

knowledge and skills.

It is noteworthy that the mediating effect of intergroup anxiety is found only statistically significant between informal contacts and metacognitive CQ. This indirect effect means the acquisition of metacognitive skills from informal interactions is partially contributed by the decrease in intergroup anxiety. This finding corroborates with C. W. Stephan and Stephan (1992) that intercultural contacts could reduce anxiety levels and negative stereotypes of outgroup members. W. G. Stephan (2014) asserts that intergroup anxiety causes negative cognitive consequences, such as depleting cognitive resources, intensifying negative stereotypes, and leading to increased prejudice against outgroup members. The negative perceptions for outgroup (intergroup prejudice) can result in underperformance in tasks that need self-regulation abilities (Richeson & Shelton, 2003). The result gives us a clue about how informal intergroup contacts can help students to consciously think about their cognitive learning process in coding and translating the information about cultural differences. It is through reducing their anxiety towards outgroup members, which could build up the confidence and awareness to deliberately control their cognitive process to retrieve and store information in intercultural contacts (Hacker et al., 1998). Except for metacognitive dimension, intercultural anxiety was not found significantly mediated other links. It reflects that anxiety levels are either not increased by formal contacts, or they do not substantially hinder the development of cognitive, motivational, and behavioral CQ.

There are also some interesting links with control variables showing the complicated antecedents of CQ including some personal traits and demographic factors. We found that female respondents show a higher score of motivational CQ, which is in contrast to the results of Rosenblatt et al. (2013). Students who are from business-related

departments have higher levels of informal intercultural contacts than nonbusiness students. Also, it is worth noted that students from Mainland China, HK local, and international groups have significant differences in formal intercultural contacts frequency. We also found that students with higher self-efficacy and openness usually possess greater CQ, and contact more frequently with people from other cultures in both formal and informal occasions, which corroborates with the findings of MacNab and Worthley (2012) and Ang et al. (2006). To extend their findings with further details, openness can better predict individuals' motivational, cognitive, and behavioral CQ, while self-efficacy explains mostly metacognitive aspect.

6. Conclusions and implications

This research extends the current intercultural education study and provides important implications by developing a more in-depth understanding of how formal and informal intercultural contacts in universities influence students' four facets of cultural intelligence. The main finding is that compared with the formal ones, contacts occur under informal settings have more significant impacts. Therefore, besides promoting internationalization in classrooms, we suggest that universities should also increase attention to the facilitation of mixing multicultural students in various extra-curricular and hall activities.

In order to achieve this objective, universities can adopt strategies to nurture an integrative environment to encourage positive intercultural contacts. The first step is to create chances of encounters for students from different cultures to meet up and interact. It is shown from the findings that interest clubs and student associations are one of the key places for students' intercultural contacts to occur. According to the observation in the university under investigation, the student union was mostly comprised of Hong

Kong local students, while Mainland Chinese and international students have separate associations. Universities should encourage the equal involvement of local and non-local students in student organizations as well as in the activities organized by them. Besides, mixing up students from different cultures as roommates or suitemates is also very helpful for building up long-term and intimate relationships. Some social events such as networking party, orientations, or culture fairs, can also be beneficial by providing opportunities for students to interact. The distances of students from different cultures are naturally shortened in the activities of common interests, such as sports, cooking, and arts. Besides, facilities and physical environments in universities should also be designed in an integrative approach, so as to create a psychological sense of equalization for students to live and study. Beyond campus, it is also important to involve the local society, such as to collaborate with communities or NGOs. Getting to know the local culture is essential for non-local students to build up belongingness and open up to meaningful intercultural contacts.

The next step is to take some measures to encourage more in-depth contacts among students from different groups because the key to experiential learning is reflections on the "shock" and "stuck" from intercultural experiences. Universities are responsible for helping students to set up the mindsets to be ready for such "shock" and "stuck", and conduct intentional reflections or discussions of such experiences. Continuous supports that students can get access to are also necessary. Besides language classes and intercultural training courses, universities can also offer intercultural mentorships to help students to understand intercultural capacity and the way to develop.

The findings also explain that the effect of informal contacts on metacognitive CQ is mediated by intergroup anxiety. Unlike a simple set of skills that can be transferred by

lectures or readings, metacognitive CQ is not easy to acquire since it is from individuals' second order cognition. MacNab (2012) point out that an experiential approach is effective to help students control their cognitive process. In this paper, we suggest that it is important to lessen students' anxiety in intercultural experiences, which can help students to be more conscious and aware about the new cultures that they are going to be exposed. Stereotypes and misconceptions held by students towards other cultures are one of the main reasons that caused intergroup anxiety. Universities can seek ways to educate students to use objective observation instead of interpretation or judgment during and before interacting with others.

This study enriches the empirical evidence of intercultural experiential learning outcomes, but it is not without its limitations. The respondents from the survey were invited from a single university which has a limited representation of all universities in Hong Kong. Even though, the findings also show some general implications for higher education institutes in general. Another drawback is that this research used cross-sectional data instead of panel data which can avoid the influence of the past experiences before universities. In future research, a longitudinal study based on the findings can be meaningful to examine the pre- and post- differences of students' cultural intelligence and the influence of their cultural exposures.

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