International Business Education Using Global Virtual Teams: Relationship Between Cultural Intelligence, Global Knowledge, and Team Performance

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Abstract

Corporate employees must interact with people from different cultures in cross-cultural environments. This study examined the extent that cultural intelligence and global knowledge predicted team performance for university students engaged in collaborative team projects resembling the global corporate work environment. The sample for this study was 2,012 students who participated in the X-Culture Global Virtual Team Project during the spring semester of 2015. Participants were members of 412 teams representing 40 countries and attending 95 universities. Study results indicated that global knowledge and cultural intelligence significantly relate to team performance. Cultural intelligence is a significant partial mediation between global knowledge and team performance in international business courses.

Keywords: Cultural intelligence, global knowledge, international business education, GVTP.

Introduction

In today's competitive environment, businesses and their employees must remain responsive to the dynamic realities of globalization. Modern organizational success relies on the ability to compete in a globalized environment while creating new ideas, accessing innovative strategies, and effectively managing ideas and strategies (Dereli, 2015). The world economy continues to grow, leaving companies with the challenge of operating in a cross-cultural environment (Misra, 2012). Interaction among people from various cultures is becoming the norm for a broad spectrum of jobs, from blue-collar to professional (Alon, Boulanger, Meyers, & Taras, 2016). Advances in technology (e.g., the Internet and network computers) have changed the very nature of work (Aggarwal, 2008). The evolution of technology will continue and poses a risk to organizations' survival. Companies' survival depends on their ability to transform the organization and successfully compete in a global environment (Maerki, 2008).

The continued expansion of the Internet facilitates virtual connection of people in various geographic locations. The virtual-teams phenomenon references the exploitation of human capital interacting

interdependently in geographically dispersed locations using information and communication technologies (Berry, 2011; Haines, 2014; Olariu & Aldea, 2014). The organization that effectively capitalizes on available computer-mediated communication technologies will remain relevant in today's business environment. Advances in technology fuel the growth of virtual teams by connecting individuals and allowing them to work together; organizations benefit from this connectivity (Gilson, Maynard, & Bergiel, 2013; Gilson, Maynard, Young, Vartiainen, & Hakonen, 2015).

Effective teamwork is the cornerstone of improvement and productivity (Bektas & Sohrabifard, 2013). The synergistic nature of teamwork increases collaborative problem-solving and innovation, among numerous other advantages. The use of human capital in dispersed locations combined with the advantages of technology increases organizations' competitive advantage (Bektas & Sohrabifard, 2013). Traditional communication modes such as e-mail and videoconferencing increase virtual teams' use of modern tools such as wikis and instant-messaging applications (Lilian, 2014; Olariu & Aldea, 2014). The birth of the global virtual team (GVT) results from the manifestation of the virtual team in a cross-border scenario. A GVT can be beneficial because a virtual team reduces resource use and costs associated with redundancy of work, time, travel, and relocation (Dekker, Rutte, & van den Berg, 2008; Gaeta, Orciuoli, Lola, & Senatore, 2011; Hsu, Liang, Wu, Klein, & Jiang, 2011; Sarker, Ahuja, Sarker, & Kirkeby, 2011).

International business education must introduce students to global virtual-team environments to prepare students for today's global collaborative business setting. It is imperative for business students to study international business as globalization continues (Aggarwal & Goodell, 2011). University business schools and international business educators must properly educate future international business managers by creating curriculum that provides students with the skills required to be successful in an international-business environment (Eisenberg et al., 2013; Jurse & Mulej, 2011; Rehg, Gundlach, & Grigorian, 2012). The study of international business is vital and must provide students with cross-cultural experiences and the skills necessary to navigate a global work environment (Duus & Cooray, 2014; Taras et al., 2013). Traditional tool case studies, videos, and lectures provide indirect experiences and do not offer direct exposure to the international-business environment (Taras et al., 2013).

Virtual teams allow businesses to collaborate in an international environment, transcending the reality of the international-business classroom environment's preparation of students (Taras et al., 2013). The use of online technologies and the edification of cultural intelligence increases cross-cultural competencies to prepare students for today's global business environment (Gonzalez-Perez, Velez-Calle, Cathro, Caprar, & Taras, 2014; Milhauser & Rahschulte, 2010; Shea, Sherer, Quilling, & Blewett, 2011). This does not indicate a complete parallel between the educational setting and the business setting; students must be prepared to work in international business regardless.

The purpose of this nonexperimental correlational study was to examine the extent to which cultural intelligence and global knowledge predict team performance for university students engaged in team projects resembling the global corporate work environment. In today's competitive environment, businesses and their employees must respond to the dynamic realities of globalization. Interaction among people from various cultures is becoming the norm for a broad spectrum of jobs (Alon,

Boulanger, Meyers, et al., 2016). Company survival depends on the company leaders' ability to transform the organization and compete in a global environment (Maerki, 2008).

International business education must introduce students to the global virtual-team environment. International business educators should consider implementing projects such as the X-Culture Global Virtual Team Project (GVTP), designed to prepare students for modern global business environments. The X-Culture GVTP brings international-business and management students from 43 countries on six continents and more than 80 universities together to engage in collaborative teamwork designed to resemble the global corporate work environment (Magnusson, Schuster, & Taras, 2014; Taras et al., 2012, 2013).

This study addresses one university's efforts to prepare students to operate in a cross-cultural environment in a global virtual setting and the factors that influenced student outcomes. Knowing the extent to which cultural intelligence and global knowledge predict team performance can help organizations avoid the problems associated with workforce lack of cultural knowledge (Barnwell, Nedrick, Rudolph, Sesay, & Wellen, 2014; Kiznyte, Ciutiene, & Dechange, 2015). Experiential GVTPs improve students' cross-cultural competencies through active engagement with culturally diverse teams (Duus & Cooray, 2014; Taras et al., 2013). Moon (2013) examined how team-level cultural intelligence relates to team performance. Data from Moon indicated that teams that displayed increased levels of cultural intelligence also exhibited higher levels of team performance.

This study built on the literature of Taras et al. (2013), who examined the benefits of hands-on experiential projects in a GVT environment and assessed how experiential projects add a dimension to international-business and international-management curriculum. Taras, who founded the X-Culture Project, revealed that experiential GVTP-based approaches have a positive impact on international-business learning. This study also builds on the literature of Zwerg-Villegas and Martinez-Diaz (2016), who addressed student participation in the X-culture project and measured the impact and difficulties in virtual and cultural aspects of the GVT. This study moves a step further and addresses how cultural intelligence and global knowledge can potentially increase student teams' ability to work together, increasing their level of preparedness to work in a global business environment.

Literature Review

We introduce the topic of teams in the review of literature, followed by a review of past and current extant research on various topics such as teams, GVT, the X-Culture GVTP, and the Business Cultural Intelligence Quotient (BCIQ) as they pertain to the study's purpose.

Teams

Teams are groups of individuals who interact interdependently and have integrative accountability, empowerment, processes, and reward systems that encourage the completion of assigned tasks (Bektas & Sohrabifard, 2013; Berry, 2011; Solansky, 2011). Companies have used teams for many years as a critical component of a modern organization (Tannenbaum, Mathieu, Salas, & Cohen, 2012). Teams increase the cohesion levels of people while creating social ties between individuals (Necşoi, 2015).

Teams operate in increasingly complex environments and must adapt to the teams' fluidity and dynamic (Tannenbaum et al., 2012). Teams play an important role in organizations, undertaking complex problems that require diversity in expertise to solve (Tannenbaum et al., 2012). Managers or team facilitators must prepare a team to operate in challenging situations, keep team members on track, and take necessary actions to enhance the team's ability to work collaboratively (Cagiltay, Bichelmeyer, & Kaplan Akilli, 2015).

Effective teamwork has proven to be the foundation for the improvement and productivity of organizations' human capital (Bektas & Sohrabifard, 2013). The synergistic nature of teamwork creates an environment that fosters collaborative problem-solving and innovation, among numerous other advantages. Teamwork, coupled with the empowerment of workers on the team, leads to improved productivity (Bektas & Sohrabifard, 2013).

GVT

GVTs are culturally diverse groups or teams that work together to achieve goal commonality by using computer-mediated technologies (Daim et al., 2012; Pinjani & Palvia, 2013). As businesses have expanded across borders, the GVT has become a normal way to conduct business, tap into broader talent pools, leverage a 24-hour work cycle, capitalize on local knowledge, and obtain international perspectives on business challenges (Derven, 2016). The enabler for GVT is technology, which—although sometimes flawed—allows the virtual team to communicate by simulating face-to-face scenarios (Derven, 2016). Global teams often coordinate tasks using communication and information technologies, which becomes a challenge when working in a virtual environment (Zander, Zettinig, & Makela, 2013). GVTs are challenged to coordinate activities at the team level, having to address team dispersion and learn how to use communication and information technologies to the team's advantage (Zander et al., 2013).

Cross-cultural training is an essential component in team success and creating an experiential learning GVTP can enhance cross-cultural abilities (Duus & Cooray, 2014; Erez et al., 2013; Taras et al., 2013). Erez et al. (2013) sought to discern if the characteristics of global identity and cultural intelligence were enhanced when using "the construction-group model of experiential learning" (p. 330) when participating in a GVTP. A sample of 1,221 graduate students participated in a 4-week GVTP. Study findings suggested that global identity and cultural intelligence improve when team members develop positive levels of trust among members (Erez et al., 2013). A GVTP offers an opportunity for members to be exposed to cross-cultural collaborative environments (Kolb, 1984) relevant to collaborating in an international environment (Taras et al., 2013). Taras et al. (2013) assessed the use of student-collaborative GVTPs in international-business and management education using a rationale that addressed three theories: social learning, intergroup contact, and experiential learning. The X-Culture GVTP is an example of a university-level GVTP.

X-Culture GVTP

The X-Culture GVTP, developed by Professor Taras of the University of North Carolina at Greensboro, is a virtual-team collaboration that attempts to enhance student learning in international business courses

using information and communication technologies (Taras et al., 2012, 2013). The X-Culture GVTP can be considered an experiential cross-cultural exercise and has proven effective in engaging students in a cross-cultural or global virtual-team environment (Duus & Cooray, 2014). The X-Culture GVTP replicates the international business environment by assembling teams that work together for an entire semester on realistic international business challenges (Tullar & Taras, 2017). The X-Culture GVTP includes university students in international business type courses from around the globe who take part in an 8-week systematized project, where students are assigned to virtual teams (Alon, Boulanger, Meyers, et al., 2016). Team sizes range from 5 to 7 students from various global locations, and these students are instructed to create a business plan for an international venture (Alon, Boulanger, Meyers, et al., 2016). Teams are exposed to various aspects of preproject training that lead to participating in instructor-supervised projects involving activities such as research and market entry (Tullar & Taras, 2017). Student participants of the X-Culture project participate at no cost to the student; the instructor who administers the X-Culture GVTP in their course pays a fee. The X-Culture GVTP brought international-business and management students from over 40 countries on six continents to engage in collaborative teamwork that mimicked the realities of today's global business environment. The GVTP used various collaborative online tools such as Google Docs, Skype, Facebook groups, Dropbox, and Google Translate (Taras et al., 2012, 2013). The project enhanced students' cultural intelligence as they students met the challenges associated with collaborating in a global virtual environment (Taras et al., 2012, 2013).

Approximately 2,000 students from 43 counties participated in the X-Culture project. The X-Culture project collected data on processes, team composition, and outcomes throughout the semester. The results from Taras et al.'s (2013) study revealed that experiential GVTP-based approaches in international-business and management learning lead to positive outcomes. These outcomes are based on the evaluated levels of learning, behaviors, and attitudes in an international experiential-learning project. In a two-part, longitudinal, and multinational study, Eisenberg et al. (2013) measured the effects of students' level of cross-cultural management on cultural intelligence. Eisenberg et al. concluded that cross-cultural management courses increased students' level of cultural intelligence. Students' levels of cultural competency improved when students were exposed to cross-cultural experiential activities, which had a positive effect on their future job performance (Eisenberg et al., 2013). Students must understand and build the global business environment; therefore, instructors must increase the quality of educational international business learning as students progress into the corporate world.

Team Performance

Team performance often links to explicit output, determined by a customer or an organization (Weimann, Pollack, Scott, & Brown, 2013). Several factors impact team performance, such as cultural diversity, cultural intelligence, trust, team cohesion, technology, and geographic challenges. Cultural diversity strongly relates to team performance (Nederveen Pieterse, van Knippenberg, & van Dierendonck, 2013). Cross-cultural competencies, along with cultural intelligence, positively impact team performance by alleviating the adverse results of cultural diversity (Moon, 2013; Sucher & Cheung, 2015). Barnwell et al. (2014) found cultural diversity to be an effective resource for global teams; however, cultural diversity also decreased team performance, perhaps due to mismanagement. Cultural intelligence is the ability to function effectively in a culturally diverse environment (Adair, Hideg, & Spence, 2013; Ang & van Dyne, 2008). Individual facets of cultural intelligence have a positive impact on

job performance and cross-cultural effectiveness (Chen, Lin, & Sawangpattanakul, 2011; Lee, Veasna, & Wu, 2013; Ott & Michailova, 2016) and positively correlate with cultural intelligence and the effectiveness of communication (Bücker, Furrer, & Lin, 2015; Ott & Michailova, 2016). Moon (2013) examined the role of team-level cultural intelligence as it relates to team performance. Study results indicated that teams that displayed increased levels of cultural intelligence also exhibited higher levels of team performance.

BCIQ

Cultural intelligence has proven important to management and international business. Understanding culture through the lens of cultural intelligence helps academic and work environments proliferate the cognitive flexibility and competencies necessary to navigate the cross-cultural environment (Alon, Boulanger, Meyers, et al., 2016; Gabrenya, Griffith, Moukarzel, Pomerance, & Reid, 2012). The four-factor model of cultural intelligence does not adequately address cultural intelligence in a business environment (Alon, Boulanger, Meyers, et al., 2016). Researchers developed the BCIQ instrument to address the limitations of other cultural quotient (CQ) measures, such as the four-factor model of cultural intelligence. The BCIQ instrument focuses on the need for culturally intelligent business managers in the global corporate workforce (Alon, Boulanger, Meyers, et al., 2016).

The BCIQ measures cultural intelligence in a business context and relies on a sophisticated measure that combines quasidirect observations and direct measures (Alon, Boulanger, Meyers, et al., 2016). Alon, Boulanger, Myers, et al. (2016) created the BCIQ to address the limitations of other cultural-intelligence measures. When validating the BCIQ, the researchers used the four-factor model of cultural intelligence and the 20-item CQ instrument to draw comparisons. The Ang et al. (2007) measure was the most widely-used measure of cultural intelligence (Alon, Boulanger, Meyers, et al., 2016).

The BCIQ comprises four factors. The first three factors use a 5-point Likert-type scale ranging from 1 (never) to 5 (always), and the fourth factor scale uses true and false responses (Alon, Boulanger, Meyers, et al., 2016). The BCIQ differs from Ang and van Dyne's (2008) four-factor model of cultural intelligence by presenting a honed factor structure, applicability to the business context, and the use of impartial cultural-knowledge measures (Alon, Boulanger, Elston, et al., 2016). The BCIQ includes four factors: "BCIQ1: Motivation; BCIQ2: Cross-cultural listening, communication and adaptation; BCIQ3: Cognitive preparation; and BCIQ4: Global knowledge" (Alon, Boulanger, Elston, et al., 2016, p. 4).

Theoretical Framework

The theoretical framework chosen for this study is the theory of cultural intelligence (Earley & Ang, 2003). Along with experiential-learning theory, cultural-intelligence theory supports the concept that different strata or sets of groups may learn differently and can be applied to undergraduate or graduate teams. Experiential-learning theory is foundational to providing a better understanding of cultural intelligence. Cultural intelligence is an individual's set of malleable abilities to function and self-manage effectively in a culturally diverse environment (Early & Ang, 2003; Leung, Ang, & Tan, 2014). The early works of Steinberg asserted that cultural intelligence is a theoretical extension of the underlying constructs of intelligence (as cited in Ang et al., 2007). Steinberg drew on a multifactor framework of

intelligence and concluded that the loci of intelligence includes metacognition, cognition, and motivation, whereas actions taken are behavioral (as cited in Ang et al., 2007). Cultural intelligence is important to international business education and affects academic and work-related performance and judgment (Alon, Boulanger, Meyers, et al., 2016; Gabrenya et al., 2012).

Ang and van Dyne (2008) applied Steinberg's different loci to the multifaceted dimensions of cultural-context diversity to identify a metacognitive CQ, cognitive CQ, motivational CQ, and behavioral CQ (Leung et al., 2014; Wang, Heppner, Wang, & Zhu, 2014). The four-factor model of cultural intelligence has limitations in its ability to measure cultural intelligence in a business context. Researchers developed the BCIQ instrument to address the limitations of CQ measures such as the four-factor model of cultural intelligence. The authors designed the BCIQ to measure cultural intelligence in a business context, relying on sophisticated measures that combine quasidirect observations and direct measurements (Alon, Boulanger, Meyers, et al., 2016).

The BCIQ's four factors of cultural intelligence provided an effective model for the present study. The theory's metacognitive factor addresses an individual's ability to process information on culture (Eisenberg et al., 2013; Morrell et al., 2013), which closely aligns with the predictor variables of cultural intelligence and global knowledge. The theory's cognitive factor addresses the individual's global-knowledge structures and the comprehension of norms and practices in cultural settings (van Dyne et al., 2008, 2012), and also aligns with the predictor variables of cultural intelligence and global knowledge. The four-factor motivation and behavior components connect to the dependent variable of team performance. Table 1 illustrates and defines the BCIQ four factors. The measure of the independent variables for cultural intelligence include BCIQ1 (motivation), BCIQ2 (listening, communication, and adaptation), and BCIQ3 (cognitive preparation). The measure for the independent variable of global knowledge is the BCIQ4 (global knowledge). Researchers measured cultural intelligence before the project commenced and after project completion (Taras et al., 2012, 2013).

Table 1
Elements of the BCIQ Four Factors

Factor	Subdimension	Definition
BCIQ1	Motivation	An assumed force operating internally that induces and individual to choose on action over another, specifically choices supporting openness to ideas, interpersonal relationships, cultural identities, and experiences
BCIQ2	Listening, communication, and adaptation	The cross-cultural utilization of baseline verbal/nonverbal awareness regarding social practices and how information is exchanged. Also, the ability to accurately modify and adapt actions according to the situation
BCIQ3	Cognitive preparation	The self-study of appropriate cross-cultural behavior/business practices
BCIQ4	Global knowledge	The level of general knowledge about other cultures in terms of facts, customs, practices, norms, and values.

Note: Reprinted with permission from "Business Cultural Intelligence Quotient: A Five-Country Study," by I. Alon, M. Boulanger, J. Elston, E. Galanaki, C. Martinez de Ibarreta, J. Meyers, … A. Velez-Calle, 2016, Thunderbird International Business Review. Advance online publication. doi:10.1002/tie.21826

The present study addressed three research questions based on the information gathered in the literature review on cultural intelligence and team performance. We also present alternative hypotheses for each research question.

Research Question 1:   Are global knowledge and cultural intelligence related to team performance controlling for other independent variables?

> H1a: Global knowledge is related to team performance controlling for other variables.

> H1b: Cultural intelligence is related to team performance controlling for other variables.

Research Question 2:   Do mean differences exist for global knowledge, cultural intelligence, and team performance between undergraduate student teams and teams with at least one graduate student present? The study explores the difference in these outcome variables between undergraduate student teams and graduate student teams.

Alternative hypotheses:

> H2a: There is a difference in average global knowledge between undergraduate student teams and graduate student teams.

> H2b: There is a difference in average cultural intelligence between undergraduate student teams and graduate student teams.

> H2c: There is a difference in average team performance between undergraduate student teams and graduate student teams

Research Question 3:   Is cultural intelligence a mediator between global knowledge and team performance? We are exploring the existence of a mediation effect between global knowledge and team performance.

> H3a: Cultural intelligence is a significant mediator between global knowledge and team performance.

Methodology

The X-Culture (2016) project administrator provided the data. Because we used secondary data for this study, the owner of the data—the X-Culture GVTP—provided consent for its use. We received e-mailed permission to use the data from the X-Culture GVTP and obtained official written permission. We had no contact with the participants in the study. Because we used data collected by the X-Culture GVTP, we could maintain the confidentiality of participants and had no information about participants' identity.

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The sample for this study consisted of 2,012 students who participated in the X-Culture GVTP during the spring semester of 2015. Participants were members of 412 teams representing 40 countries and attending 95 universities. Of team observations, we identified 12 as outliers and removed them from the sample. We used the remaining 401 teams for analysis. Table 2 provides a description of the sample of teams (*n* = 401).

Table 2
Description of the Sample

Variable	Minimum	Maximum	Mean	StDev
Percent Male	.00	1.00	.48	.23
Percent International	.00	1.00	.70	.20
Team Size	3.00	7.00	4.72	1.08
Percent Graduate	.00	1.00	.22	.36
Global Knowledge	.30	.80	.60	.10
Cultural Intelligence	3.40	4.64	4.05	.25
Average Performance score	2.20	6.80	4.91	.77

n = 401 teams

The average size of participating teams was 4.72 participants and team sizes ranged from 3 to 7 students. The average team consisted of 22% graduate students and 88% undergraduate students. The average team also consisted of 48% male students. International students played a large role in the sample, with 70% of the teams having at least one international student. Global knowledge scores were collected and the average percent correct was 60.3%. A Likert-type rating scale was used to collect cultural-intelligence information. The mean score was 4.05 (*s* = .25).

The methodology used for data analysis included a multiple regression analysis, independent samples *t*-tests, and a path analysis used to test mediation effects. We used team-performance scores as the dependent variable for the multiple regression analysis with percent male, percent international, percent graduate, cultural intelligence, and global knowledge as the independent variables. We used a significance of alpha = .05 to determine statistically significant results. We checked diagnostics and assumptions related to multicollinearity, normality of residuals, and homoscedasticity. No problems emerged for any of the assumptions or multiple regression diagnostics. We calculated Mahalanobis distances and identified 11 teams as multivariate outliers. We did not include these 11 teams in the data analysis, resulting in a sample size of 401 teams.

We tested the mediation effect of cultural intelligence using path analysis and LISREL software (Jöreskog & Sörbom, 2018). Mediator variables transmit a portion of the effect of a prior variable onto a subsequent one (Kline, 1998), known as indirect effects. The path analysis included in this study provided a test of the mediation effect of cultural intelligence, which receives an effect from the global-knowledge variable and passes the effect on to the team-performance variable.

Measures

We measured the independent variables of cultural intelligence and global knowledge using archived X-Culture GVTP data gathered using the BCIQ instrument. We used true and false items to measure the variable of global knowledge and a Likert-type scale to measure the variable of cultural intelligence. We measured the outcome variable of team performance using archived X-Culture GVTP data gathered from the assessment of team performance by the project's instructors (Magnusson et al., 2014). We calculated reliability of the BCIQ instrument using Cronbach's alpha, which was $\alpha = .88$ for the sample. We measured cultural Intelligence using 13 Likert-type items addressing the BCIQ factors of BCIQ1-Motivation (eight items), BCIQ2-Listening, communication and adaptation (three items), and BCIQ3-Cognitive preparation (two items). We computed the cultural intelligence variable using the average score for these 13 items and calculated the global-knowledge variable separately, using the responses of 20 true/false items measuring global knowledge. We assigned a score of 1 for a "true" response and a score of 0 for a "false" response. We calculated global-knowledge scores as the percentage of "true" responses for each participant. Although researchers have identified the global-knowledge variable as a factor in the overall construct of cultural intelligence, we did not include the global-knowledge variable itself in the overall cultural-intelligence score. Rather, we calculated the global-knowledge variable as a separate and independent variable from cultural intelligence for this study.

Data Analysis

We used multiple regression analysis to determine significant relationships between team-related variables collected for the study and the resulting team-performance scores. Table 3 displays the results of the multiple regression analysis.

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Table 3
Multiple Regression Results

Variable	B	Std. error	Beta	t	*p*-value
(Constant)	2.45	.66		3.69	.000
Percent Male	-.46	.17	-.14	-2.77	.006
Percent International	.21	.19	.05	1.10	.274
Percent Graduate	-.15	.10	-.07	-1.47	.142
Global Knowledge	.89	.38	.12	2.34	.020
Cultural Intelligence	.50	.15	.16	3.33	.001

Note: Team performance is the dependent variable.

The percent variance of team performance scores explained by the multiple regression model was a relatively low 8.1%. Three team-related variables significantly related to team performance: (a) percent male, (b) global knowledge, and (c) cultural intelligence.

As the percentage of men on the team increased, team performance declined (B = -.46, t = -2.77, p < .05) controlling for other independent variables. As the average percent correct for global-knowledge scores increased, team performance also increased (B = .89, t = 2.34, p < .05) controlling for other independent variables. Finally, as cultural-intelligence scores increased, team performance also increased (B = .50, t = 3.33, p < .05) controlling for the other independent variables. The most important predictors of team performance were cultural-intelligence scores (Beta = .16), followed by percent male (Beta = -.14), and finally, average percent correct for global-knowledge scores (Beta = .12).

We conducted independent *t*-tests to determine if a mean difference between teams with graduate students and teams without graduate students arose for the various team-related scores (see Table 4).

Table 4
Results of Independent Samples t-Tests

Dependent Variable	Groups	Mean	StDev	t	*p*-value
Global Knowledge	Undergrad Teams	.61	.09	2.80	.005
	Teams with Grad Students	.59	.11		
Cultural Intelligence	Undergrad Teams	4.04	.24	-1.41	.160
	Teams with Grad Students	4.07	.26		
Average Performance score	Undergrad Teams	4.89	.79	-.63	.528
	Teams with Grad Students	4.94	.73		

Note: Undergraduate teams n = 253; teams with graduate students n = 148.

Significant mean differences in the average percent correct of the global-knowledge test emerged between undergraduate teams (mean = .61, s = .09) and teams with graduate students (mean = .59, s = .11). Teams with graduate students scored slightly lower on the global-knowledge test than teams of

solely undergraduate students (mean difference = .02). No significant differences emerged in average cultural-intelligence scores or average team-performance scores between undergraduate teams and teams with graduate students.

The final analysis included a test of cultural intelligence as a mediator between global knowledge and team performance. We calculated the path model (see Figure 1) to determine the relationships between these three variables in a path of global knowledge leading to cultural intelligence, which led to team performance. The results of the initial path analysis showed a significant path from the beginning to the ending variable. Figure 1 includes the *t*-values for each path. Each path was statistically significant and positively related at the alpha = .05 level of significance.

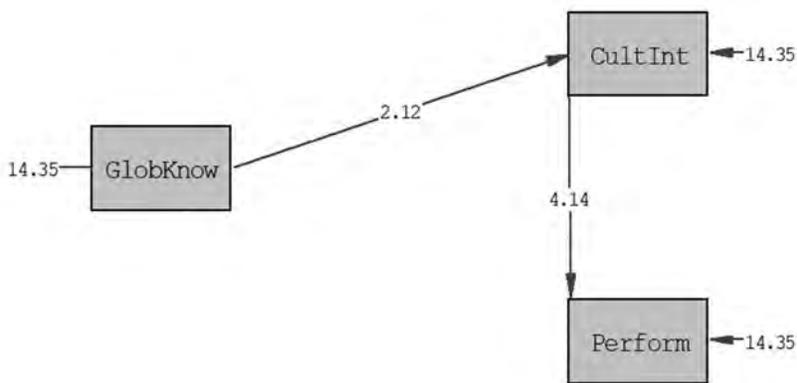**Figure 1: Path analysis of team variables**

Figure 1. Path analysis of team variables.

Next, we conducted a mediation test to test the mediation effect of the cultural-intelligence variable. This test required us to add a path between the global-knowledge score and the team-performance outcome. Figure 2 shows the results of this test.

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Figure 2: Mediation effect of cultural intelligence
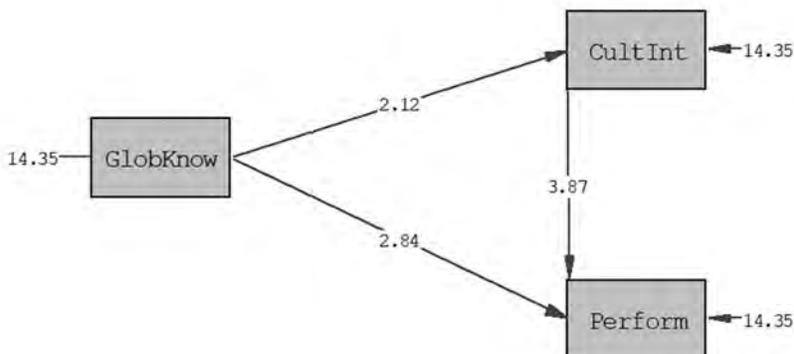
Figure 2. Mediation effect of cultural intelligence.

The mediation effect resulted in a significant path from global knowledge to team performance. As a result, cultural intelligence was a partial mediator between global knowledge and team performance. Part of global knowledge was mediated by cultural intelligence, whereas the other part of global knowledge led to team performance. In summary, cultural intelligence is considered a partial mediator of the significant effect that originates with global knowledge and ends with team performance.

Conclusion

Study findings indicated that cultural intelligence and global knowledge increase the ability of student teams to work together and increase students' level of preparedness to work in a global business environment. This is a significant finding for those involved in international business education, as international business courses prepare students to function in a team-based, computer-mediated GVT environment. The BCIQ four-factor model of cultural intelligence was an appropriate model, and this study's tests supported the model. The theory's metacognitive factor addressed an individual's ability to process information on culture (Eisenberg et al., 2013; Morrell et al., 2013), which closely aligns with the predictor variables of cultural intelligence and global knowledge.

The use of global teams and intercultural teams is increasing, and business courses must prepare students to function on international business teams. Students who experience these types of preparations will be able to function in the global virtual reality of teamwork and provide new insights to improve international business education. It is yet to be determined how cultural intelligence and global knowledge will impact business, international business education, or government; however, it is clear that ignoring these educational elements would be a mistake.

The predictor variable and cultural intelligence relate positively to team performance. Cultural intelligence is a predictor of successful team performance as well as a mediator between global knowledge and team performance. Moon (2013) examined the role of team-level cultural intelligence as it relates to team performance. Study results indicated that teams that displayed increased levels of

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cultural intelligence also exhibited higher levels of team performance. The findings in this study support the Moon study.

Findings implied that global businesses, universities that employ international business educators, and other organizations should seek greater cultural intelligence in employees to increase team performance. Additionally, global knowledge relates positively to team performance. This finding implies that individuals who increase their global knowledge increase their chances of gaining positive team outcomes. Universities teaching international business courses need to provide curricula to increase global knowledge, and businesses must consider employing people with greater global knowledge.

Study results indicate that cultural intelligence and global knowledge increase a team's performance. Although graduate students should have more educational experience, these students did not necessarily impart more global understanding, which may explain why the difference between the two groups (undergraduate and graduate) did not affect student learning. International-business educators must consider integrating curriculum that equates to experience in global understanding rather than solely academic learning. Separating the two groups is not effective unless the curriculum focuses on giving students opportunities to increase global understanding with real-world projects.

Limitations and Future Research

The present study considered possible limitations to internal and external validity. When discussing validity, one refers to the inexact verity of inferences, propositions, or conclusions; external validity refers to the verities of the conclusions that involve generalizations ("External Validity," n.d.). A notable threat to external validity was that the data accrued from college students in an academic setting; thus, study findings may not be generalized beyond the academic setting in which the project occurred. Internal validity seeks truth in inferences of causal and cause–effect relationships ("Internal Validity," n.d.). Internal validity did not apply to this study because establishing a causal relationship was not the study's purpose.

One limitation of this study on real-life learning in GVT was that we could not assess the learning students acquired, beyond the knowledge imparted by the international-business curriculum. Thus, we could not determine whether adding to the curriculum would be effective; however, it makes reasonable sense that anything added to the curriculum that gives students realistic learning experiences would enhance the international business curriculum. It would be useful to conduct a future study that discerns how the university trains international business chairs and how international business instructors create curriculum to prepare students for real-life experiences. One area to further investigate is whether the curriculum presented to students prepares them for the global corporate workforce, particularly if courses challenge students to participate in realistic international business experiences. A teaching study arising from this research may go to the core of international business learning curriculum development.

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