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Investigating the Impact of Gender Composition on Team Performance: A Cross-Cultural Study of Student Teams

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ABSTRACT

This study investigated if the gender composition of teams impacts performance by examining the relationship between student-level variables of cultural intelligence and global knowledge and team-level variables of team performance. Data were collected from 1,922 students across 40 countries participating in 446 teams. Results of independent samples t-tests, as well as multiple regression analyses at the student and team levels, showed that gender and international status were related to global knowledge and cultural intelligence, whereas gender, global knowledge, and cultural intelligence were all significantly related to team performance. The coefficient of variation was found to be low, suggesting that other variables might be related to team performance, cultural intelligence, and global knowledge. Implications and limitations are discussed.

Keywords: Gender composition, cultural diversity, team performance, student teams

Introduction

Effective teamwork is the foundation of an organization's improvement and productivity (Bektas & Sohrabifard, 2013; Randazzo-Davis, 2017). Although it is commonly highlighted that teamwork brings advantages, it is crucial to acknowledge the nature of team dynamics and how different degrees of gender diversity can improve or impede team performance. With the increasing significance of collaboration in today's business environment, it is essential to understand performance and how gender diversity may play a role in said performance (Städter et al., 2022). The synergistic nature of teamwork allows for collaborative problem-solving and innovation, among numerous other advantages (Bektas & Sohrabifard, 2013; Randazzo-Davis, 2017). Gender differences and their impact on team performance have attracted attention from the media and academia (Apesteguia et al., 2012). The global workforce has seen an increase in women's participation, reflecting the growing importance of gender diversity in the workplace (Ali et al., 2011; Schneid et al., 2015). The increasing number of

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women entering the workforce has created research interest in the effect of gender diversity on work outcomes and team performance (Schneid et al., 2015).

University business schools and international business educators must properly educate future international business managers by creating a curriculum that provides students with the skills required to be successful in the global workforce (Eisenberg et al., 2013; Jurse & Mulej, 2011; Rehg et al., 2012). As universities work towards preparing business managers with the necessary skills, it is crucial for educators to carefully evaluate whether the current focus on specialized skills truly meets the diverse requirements of the contemporary global business landscape. For example, teamwork is a commonly used pedagogical tool in university business education courses (Andrade et al., 2021). Academia has long focused on developing subject-specific competencies, but proficiency in these competencies is not enough to enhance students' employability (Cotton, 2001; Takeda & Homberg, 2014).

Business school programs benefit from offering students opportunities to add international experiences to their curriculum. According to Iskhakova and Ott (2020), providing students with cross-cultural activities during their international business coursework can create a balance for students who cannot study abroad for various reasons. Educators, especially those who teach international business courses, should introduce students to global virtual team environments to prepare students for today's global collaborative business setting and improve their cultural intelligence (Randazzo-Davis & Nelson, 2020). Although it may make sense to introduce students to global virtual team environments to prepare students for the workplace, it is important to consider how effectively virtual interactions can truly replicate the dynamics involved in intercultural collaboration and enhance their cultural intelligence. Understanding how and if gender composition, cultural intelligence, and global knowledge affect team performance outcomes can benefit educators conducting teamwork assignments. This research is a continuation of the researchers' previous work on experiential learning using global virtual teams that aimed to ascertain if gender diversity enhances team performance and the influence that cultural intelligence and global knowledge exposure have on the outcome of that team performance.

Literature Review

Gender-Diverse Teams

The significance of teamwork continues to garner attention, and the influence of gender composition within a team has received attention and deserves further investigation. With the growing number of women in the workforce, it is crucial to examine the impact of gender diversity on team performance, as highlighted in studies by Weinstein (2018) and Kelemen et al. (2019). Various researchers have studied the effects of team diversity on team performance. Takeda and Homberg (2014), Maznevski (1994), and Millken and Martins (1996) are just a few who examined team diversity in both educational and workplace settings. Research conducted by Orlitzky and Benjamin (2003), in which they surveyed 138 students, showed mixed results regarding mixed-gender groups outperforming homogeneous groups; the research's findings were inconclusive, indicating the need for investigation involving more diverse populations. Research by Takeda and Homberg concluded that gender-diverse teams are more effective, and male-dominant teams experience lower performance. Recent research indicates that having women

in a team greatly enhances team collaboration, as measured by collective intelligence, regarding team processes (Bear & Woolley, 2011; Woolley et al., 2010). Additionally, Jehn et al.'s (1999) findings indicated that gender diversity positively affects team commitment and performance.

According to Kearney et al. (2022), gender-diverse teams perform better than gender-homogeneous teams under low time pressure; however, the opposite appears to be true when the time pressure is high. Kashima et al.'s (2011) research indicated that women are more likely than men to have an interdependent self-construal, which leads to higher levels of cultural intelligence. Self-construal refers to how individuals define themselves independently or interdependently with others, as defined by Cross and Madson (1997). Schneid et al.'s (2015) study revealed that the impact of gender diversity on team performance may be negative or positive depending on the cultural context in which the team operates.

Culturally Diverse Teams

Research has shown that cultural diversity can positively and negatively affect team performance. On the one hand, cultural diversity can enhance creativity and innovation by increasing the variety of perspectives, ideas, and knowledge available to the team. Studies have found that culturally diverse teams are more likely to generate novel solutions to problems and make better decisions (Cox, 1994; Jehn & Bezrukova, 2010). It is crucial to consider if these advantages are applicable in all situations or if they rely on factors within the team, like the style of leadership, the type of task at hand, or the existing levels of trust and understanding among the team members. However, cultural diversity can also lead to communication barriers, misunderstandings, and conflicts that hinder team performance. For example, scholars have found that cultural differences in communication styles, norms, and values can lead to misunderstandings and mistrust among team members (Earley & Mosakowski, 2004; DiStefano & Maznevski, 2000). Organizations and educational institutions seeking to maximize the benefits of cultural diversity in their teams should consider the nature of the task, team processes, and the level of cultural diversity when designing and managing their teams. The outcomes of this research could differ if we considered factors like individual cultural intelligence, perspectives on diversity, or the broader cultural environment in which the team functions. Effective communication, collaboration, and conflict-management strategies can help teams overcome the challenges of cultural diversity and enhance their performance.

Research indicates that cultural context plays a crucial role in shaping the dynamics of diversity and team performance. The relationship between team performance and gender diversity can differ depending on the cultural context in which the team is rooted (Schneid et al., 2015; van Knippenberg & Schippers, 2007). Furthermore, contextual factors such as gender diversity can interact with cultural diversity to produce varying effects on team performance, as highlighted in previous studies (Stahl et al., 2010). In response to the inquiry of whether greater exposure to diverse cultures translates to a higher cultural intelligence level, Crowne (2008) concluded that depending on the depth and breadth of exposure (e.g., working abroad and receiving education abroad), cultural intelligence substantially increased when working in more than one country compared to only working in one country for a short period of time.

Team Performance

According to Katzenback and Smith (1993), a team is a cohesive group of individuals, each possessing unique skill sets, who share a common goal, a set of performance objectives, and a mutual commitment to being accountable to one another for their actions. Managers or facilitators of teams need the knowledge and ability to prepare the 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 et al., 2015). Research indicates that team diversity promotes innovation and the creation of new ideas, whereas homogeneous teams have issues with conformity to group values (Derven, 2016). Notably, team performance is often linked to explicit output determined by a customer or an organization (Weimann et al., 2013). Various factors impact team performance, such as cultural diversity and intelligence, trust, team cohesion, technology, experience, and gender diversity (Bennett & Wright, 2010; Kozlowski & Ilgen, 2006; Mathieu et al., 2008). Cultural diversity strongly relates to team performance (Nederveen Pieterse et al., 2013); for example, Moon (2013) and Sucher and Cheung (2015) found that possessing cross-cultural competencies and cultural intelligence can have a positive impact on team performance by mitigating the adverse effects of cultural diversity. Additionally, Barnwell et al. (2014) found that cultural diversity can be an asset for global teams. Moon investigated the relationship between team-level cultural intelligence and team performance, revealing that teams with higher cultural intelligence also tended to exhibit higher levels of team performance.

Theoretical Framework

This study relied on multiple theoretical frameworks to explore the relationship between gender and team performance. The cultural intelligence theory (Earley & Ang, 2003) theoretically supports the concept that different strata or sets of groups may learn differently, which may apply to gender diversity performance in teams. Social identity theory (van Knippenberg, 2000) suggests that individuals categorize themselves and others into social groups, including gender, and that group membership influences behavior. This theory also proposes that gender diversity can have either a positive or negative effect on team performance, depending on factors such as group cohesion and intergroup relations (van Knippenberg et al., 2004). Contingency theory (Joshi & Roh, 2009; Park, 2020) is another relevant theory, suggesting that the relationship between gender diversity and team performance may be contingent on contextual factors such as task complexity, team size, and external pressures. Finally, although social learning theory (Bandura, 1977) highlights the importance of attention, retention, and reproduction in learning through observational learning and modeling behavior, the benefits of working in culturally diverse teams in developing valuable insight into various cultures may be supported more closely with the cultural intelligence theory.

Working in diverse teams with individuals with different cultural backgrounds and perspectives can provide employees with valuable insights and knowledge about other cultures (Bandura, 1977; Iskhadoba & Ott, 2020). Cultural intelligence is an individual's set of malleable abilities to function and self-manage effectively in a culturally diverse environment (Earley & Ang, 2003; Leung et al., 2014). Research has demonstrated that acquiring cultural intelligence can enhance an individual's ability to operate effectively in such environments (Adair et al., 2013; Ang & van Dyne, 2008) and is a necessary tool for adapting to cultural differences (Kim et al., 2015; Li et al., 2016). Cultural intelligence is a

theoretical extension of the underlying constructs of intelligence based on the early works of Steinberg (as cited in Ang et al., 2007). Steinberg drew on a multifactor intelligence framework and assessed that the loci of intelligence include metacognition, cognition, and motivation. In contrast, the actions a person takes are behavioral (Steinberg, as cited in Ang et al., 2007). By cultivating cultural intelligence, individuals in academic and workplace settings can acquire the competencies and cognitive flexibility needed to navigate cross-cultural environments, as demonstrated in studies by Alon et al. (2016) and Gabrenya et al. (2012). Considering this study suggests that having cultural intelligence can positively impact someone's capacity to navigate in a diverse environment, it was important to examine how this ability is fostered or inhibited within team settings.

The four-factor model of cultural intelligence has been found inadequate for addressing cultural intelligence in a business environment (Alon et al., 2016). To overcome the limitations of existing cultural quotient measures such as the four-factor model, researchers have developed the Business Cultural Intelligence Quotient (BCIQ) instrument. The BCIQ assessment is designed to evaluate the cultural intelligence of business managers with a specific focus on the need for culturally intelligent business managers in the global corporate workforce (Alon et al., 2016). The BCIQ assessment employs a combination of quasi-direct observations and direct measures of cultural intelligence in a business context. Although the BCIQ offers a method of measuring cultural intelligence within a business setting, it is essential to consider if this tool fully encompasses the effects of gender diversity on team performance.

Methodology

The X-Culture project administrator provided the data for this study. Because the researchers used secondary data for this study, the owner of the data—the X-Culture Global Virtual Team Project (GVTP)—provided consent for its use. The researchers received email permission to use the data from the X-Culture GVTP and obtained official written permission. The researchers had no contact with the participants in the study. Because the researchers used data collected by the X-Culture GVTP, they could maintain the confidentiality of participants and had no information about participants' identities.

Measures

The researchers measured the independent variables of cultural intelligence and global knowledge using archived X-Culture GVTP data gathered via the BCIQ instrument. True and false items were used to measure the variable of global knowledge and a Likert-type scale was used to measure the variable of cultural intelligence. The researchers 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 (see Magnusson et al., 2014). The reliability of the BCIQ instrument was calculated using Cronbach's alpha, which was $\alpha = 0.88$ for the sample.

The researchers measured cultural intelligence using 13 rating-scale items addressing the BCIQ factors of the BCIQ1-Motivation (eight items); BCIQ2-Listening, communication, and adaptation (three items); and BCIQ3-Cognitive preparation (two items). The cultural intelligence variable was computed using the average score for these 13 items, and the researchers calculated the global knowledge variable

separately using the responses of 20 true/false items measuring global knowledge. The researchers assigned a score of 1 for a "true" response and a score of 0 for a "false" response. Global knowledge scores were calculated as the percentage of "true" responses for each participant. Although prior researchers have identified the global knowledge variable as a factor in the overall construct of cultural intelligence, the researchers of the present study did not include the global knowledge variable itself in the overall cultural intelligence score. Rather, they calculated the global knowledge variable as a separate and independent variable from cultural intelligence for this study.

The report overall rating was a score to rate the teams' overall performance. Instructors used a rating scale between 1 and 7 to rate overall team performance, with higher scores leading to higher performance. Instructors followed a strict rubric for scoring each team's performance. Instructor scores were averaged to provide one overall rating for each team.

Results

The sample for this study consisted of 1,922 students. These participants comprised 446 teams and represented 40 countries and 95 universities. Tables 1 and 2 provide a description of the student-level variables and team-level variables used in this study.

Table 1
Student-Level Descriptive Statistics

Variable	Minimum	Maximum	Mean	Std. deviation
Age	18.00	56.00	22.72	3.93
Female	0.00	1.00	0.53	0.50
International	0.00	1.00	0.69	0.46
Graduate	0.00	1.00	0.20	0.40
Global knowledge	0.00	1.00	0.60	0.20
Cultural intelligence	1.39	5.00	4.04	0.54

Note. n = 1,922.

The average age of the students in this study was 22.7 years old (*SD* = 3.93). Within the sample, 53% of the participants were female students and 69% of the participants were international students. Graduate students comprised 20% of the sample. For the global knowledge and cultural intelligence scores, the average score for the global knowledge test was 60%, whereas the average score for the cultural intelligence questionnaire was 4.04 on a rating scale of 1 to 5.

Table 2
Team-Level Descriptive Statistics

Variable	Minimum	Maximum	Mean	Std. deviation
Graduate percentage	0.00	1.00	0.22	0.36
International percentage	0.00	1.00	0.68	0.24
Female percentage	0.00	1.00	0.52	0.25
Average age	19.0	37.0	22.8	2.33
Average cultural intelligence	2.77	4.63	4.03	0.28
Average global knowledge	0.20	0.90	0.60	0.11
Team size	2.00	7.00	4.29	1.29
Report overall rating	2.00	6.83	5.03	0.86

Note. n = 446.

When looking at the overall team statistics, graduate students comprised 22% of the teams, international students comprised 68% of the teams, and females comprised 52% of the teams. The average age of the team members was 22.8 years old. The average team cultural intelligence score was 4.03, whereas the average global knowledge score for the teams was 60%. The average size of a team was 4.29 team members, and the overall report rating average was 5.03 for the teams.

Student-Level Data Analysis

The researchers used an independent samples *t*-test to determine if any gender differences existed for global knowledge and cultural intelligence. Multiple regression analysis was used to determine significant relationships between student-level variables related to global knowledge and cultural intelligence, as well as team-level variables and the associated team performance scores. Table 3 displays the results of the descriptive statistics and independent samples *t*-test for cultural intelligence and global knowledge between men and women.

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Table 3
t Test for Global Knowledge and Cultural Intelligence by Gender

Dependent variable	Gender	Mean (Std. dev)	Mean difference (male–female)	*t*-statistic	*p*-value
Global knowledge	Male	0.58 (0.20)	-0.04	-4.19	0.000
	Female	0.62 (0.19)			
Cultural intelligence	Male	3.99 (0.55)	-0.09	-3.28	0.001
	Female	4.08 (0.54)			

Note. Male sample size = 912; female sample size = 1,010; *df* = 1,920; Levene's Test for Equal Variance for Global Knowledge (*F* = 3.58, *p* = 0.062); cultural intelligence (*F* = 0.625, *p* = 0.429); Cohen's *d* effect size for global knowledge = 0.19; cultural intelligence = 0.54.

The results of the *t*-tests comparing mean differences in global knowledge and cultural intelligence between men and women in the sample show that females scored significantly higher than males for both global knowledge (*t* = -4.19, *p* < 0.01) and cultural intelligence (*t* = -3.28, *p* < 0.01).

Next, multiple regression analyses were conducted at the student level to determine if any significant relationships existed between student-level variables and student-level scores of global knowledge and cultural intelligence. Each multiple regression analysis included the identification and removal of multivariate outliers using the Mahalonobis Distance statistic. Outliers that were identified at the *p* < 0.001 level of significance were removed, along with studentized residuals that were outside the range of 2.50. The first regression analysis examined the relationship between student age, gender, international status, graduate student status, and global knowledge with the dependent variable of cultural intelligence. A total of 48 multivariate outliers were removed.

The second regression analysis examined the relationship between student age, gender, international status, graduate student status, and cultural intelligence with the dependent variable of global knowledge. A total of 121 multivariate outliers were removed. After removing the multivariate outliers, assumptions tests for multicollinearity, normality of residuals, and homoscedasticity were conducted. No problems related to these regression assumptions were detected. Table 4 shows the results of the cultural intelligence regression model for the students.

Table 4

Regression Analysis for Cultural Intelligence

Variable	*B*	Std. error	Beta	*t*	*p*-value
(Constant)	3.843	0.099		38.72	0.000
Age of student	-0.002	0.004	-0.01	-0.40	0.691
Female student	0.072	0.024	0.07	3.03	0.002
International student	0.077	0.026	0.07	2.98	0.003
Graduate student	0.011	0.030	0.01	0.37	0.710
Global knowledge	0.256	0.062	0.10	4.14	0.000

Note. Dependent variable: Cultural intelligence; $R^2 = 0.022$.

The results of the regression analysis for cultural intelligence were as follows. First, students' age was not related to cultural intelligence ($B = -0.002$, $p = 0.691$), and students' gender was significantly related to cultural intelligence ($B = 0.072$, $p < 0.01$). Female students scored higher than male students after controlling for the other independent variables. Students' international status was significantly related to cultural intelligence ($B = 0.077$, $p < 0.01$), and international students scored higher than American students. Students' graduate status was not related to cultural intelligence ($B = 0.011$, $p = 0.710$), and students' global knowledge was significantly related to cultural intelligence ($B = 0.256$, $p < 0.01$). As global knowledge increased, cultural intelligence scores also increased significantly. Table 5 shows the results of the cultural intelligence regression model for the students.

Table 5

Regression Analysis for Global Knowledge

Variable	B	Std. error	Beta	*t*	*p*-value
(Constant)	0.405	0.037		10.93	0.000
Age of student	0.003	0.001	0.06	2.62	0.009
Female student	0.018	0.007	0.06	2.73	0.007
International student	0.018	0.007	0.06	2.48	0.013
Graduate student	-0.001	0.008	-0.00	-0.12	0.902
Cultural intelligence	0.034	0.006	0.12	5.27	0.000

Note. Dependent variable: Global knowledge; $R^2 = 0.029$.

The results of the regression analysis for global knowledge were as follows: Age of the student was significantly related to global knowledge ($B = 0.003$, $p < 0.01$). As age increased, global knowledge increased. Gender of the student was significantly related to global knowledge ($B = 0.018$, $p < 0.01$).

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Female students scored higher than male students. International status of the student was significantly related to global knowledge (B = 0.018, p < 0.05); international students scored higher than American students. Graduate status of the student was not related to global knowledge (B = -0.001, p = 0.902), and cultural intelligence of the student was significantly related to global knowledge (B = 0.034, p < 0.01). As cultural intelligence increased, global knowledge also increased.

Team-Level Data Analysis

Next, a multiple regression analysis was conducted at the team level to determine any significant relationships between team-level variables and team performance scores measured by the team's report of overall rating. Multivariate outliers were examined, but none were found or removed for this regression analysis. Linear regression assumptions tests for multicollinearity, normality of residuals, and homoscedasticity were conducted. No problems related to these regression assumptions were detected. The results for the team-level analysis have been identified in Table 6.

Table 6

Regression Analysis for Team's Report of Overall Rating

Variable	B	Std. error	Beta	t	Sig.
(Constant)	2.310	0.734		3.149	0.002
Graduate student %	0.035	0.113	0.015	0.313	0.754
International student %	0.224	0.166	0.064	1.346	0.179
Female %	0.418	0.163	0.122	2.559	0.011
Average age	0.007	0.017	0.018	0.38	0.704
Average cultural intelligence score	0.405	0.144	0.132	2.803	0.005
Average global knowledge score	0.854	0.376	0.109	2.27	0.024
Team size	0.011	0.032	0.016	0.335	0.738

Note. Dependent variable: Team's report of overall rating; R^2 = 0.064.

The results of the regression analysis for the team's report of overall rating were as follows: The percent of graduate students on the team was not related to the team's overall rating. The percent of international students on the team was not related to the team's overall rating. The percentage of female students on the team was related to the team's overall rating (B = 0.418, p < 0.05). As the percentage of female students increased on the team, the team's overall ratings also increased significantly. The average age of the students on the team was not significantly related to the team's overall rating. The average cultural intelligence score for the team was related to the team's overall rating (B = 0.405, p < 0.05). As the average cultural intelligence score for the team increased, the team's overall rating also increased significantly. The average global knowledge score for the team was related to the team's overall rating (B = 0.854, p < 0.05). As the average global knowledge score for the team

increased, the team's overall rating also increased significantly. Finally, the team size was not related to the team's overall rating.

Conclusion

Team diversity is an important aspect to consider when assembling a high-performance team. A greater number of women have entered the workforce, which has created research interest in the effect of gender diversity on work outcomes and team performance (Schneid et al., 2015). This study continued the researchers' previous work on experiential learning using global virtual teams that aimed to ascertain if gender diversity enhances team performance and the influence that cultural intelligence and global knowledge exposure have on the outcome of that team performance.

This study explored the relationship between gender diversity, cultural intelligence, global knowledge, and team performance. Gender diversity was measured by the percentage of females that comprised student teams, and this research explored significant effects on team performance as the diversity of the team changed. Diversity of the team was measured by percentages of international students, percentages of graduate students, and percentages of female students for each team. The study results revealed that gender diversity was significantly related to team performance. As the percentage of female team members increased, team performance scores increased even after controlling for other variables such as global knowledge of the team, cultural intelligence, average age of the team, graduate student composition, and international student composition of the team.

From an educator's perspective, the study discoveries provide insights into classroom practices and teaching methods. The outcomes emphasize the significance of fostering gender diversity within the classroom as it impacts team performance. Educators can work towards achieving this by forming study groups and project teams that include a mix of genders, encouraging balanced representation in class discussion and leadership roles. Furthermore, the study's findings regarding the influence of cultural intelligence and global knowledge on team performance suggest incorporating elements that cultivate these qualities into the curriculum. This could involve organizing workshops on cultural communication, offering courses on global politics or international relations utilizing case studies from diverse perspectives, and promoting exchange programs. Another interesting finding from the study is that international students tended to have higher levels of cultural intelligence and global knowledge. This gives educators a reason to encourage international exposure among students. Through study abroad programs, internships abroad, or any other cross-cultural experiences, ultimately, the aim is to create an enriching learning environment.

The study results are supported by prior studies suggesting that increased team diversity can lead to improved performance outcomes. For instance, Bear and Woolley (2011) found that gender diversity positively influences group processes, and teams comprised of a higher proportion of women exhibit improved interaction. Moreover, Østergaard et al. (2009) discovered that having a higher proportion of female employees in a group is associated with positive outcomes, such as increased innovation. These findings align with other studies that have reported increased performance with greater team diversity.

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Limitations and Future Research

Although many significant relationships and differences were found using the t-test and multiple regression analyses, the coefficient of variation was very low for the regression analyses. As a result, there are other factors that are related to team performance, cultural intelligence, and global knowledge that were not included in this study, given the limitations of the variables and data collected. Further research should be conducted to determine what other variables might be related to team performance, cultural intelligence, and global knowledge.

One aspect to consider is the exploration of factors that can impact team performance. These factors include team dynamics, leadership style, socioeconomic status, educational background, language proficiency, and the specific projects that teams are working on. The study's low coefficient or variation suggests the presence of influential factors that were not accounted for in the analysis. In addition to research, qualitative methods could provide insights into how cultural intelligence and global knowledge influence team performance. In-depth interviews or case studies could provide insights into the contributions made by individuals with an understanding of different cultures. Furthermore, the results of this study could serve as a foundation for investigating the effects of cultural intelligence training on team performance.

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