

A Global Classroom? Evaluating the Effectiveness of Global Virtual Collaboration as a Teaching Tool in Management Education

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We evaluate the effectiveness of global virtual student collaboration projects in international management education. Over 6,000 students from nearly 80 universities in 43 countries worked in global virtual teams for 2 months as part of their international management courses. Multisource longitudinal data were collected, including student and instructor feedback, course evaluations, assessment of changes in knowledge, attitudes, and behaviors following the experiential project, and various indicators of individual and team performance. Drawing on experiential learning, social learning, and intergroup contact theories, the effectiveness of the experiential global virtual team-based approach in international management education was evaluated at the levels of reactions, learning, attitudes, behaviors, and performance. The findings show positive outcomes at each level, but also reveal challenges and limitations of using global virtual team projects for learning and education. Implications for international management education and suggestions for future research are discussed.

Tell me, I'll forget; show me, I'll remember;
involve me, I'll understand.

Confucius

Global competencies are increasingly becoming a workplace requirement, regardless of the industry or geographic location. As the demand for personnel capable of high performance in a multicultural workplace is rising, a greater number of business schools are updating their curricula and devising new educational tools that can better prepare their graduates for the increasingly global business environment (Jurse & Mulej, 2011; Rehg, Gundlach, & Grigorian, 2012). Although recent evidence suggests that cross-cultural management courses have a positive impact on future job performance (Eisenberg et al., in press), business schools are not yet meeting this challenge adequately, as evidenced by rather low student confidence in their ability to deal with real global business issues (Blasco, 2009).

Researchers have often emphasized that cross-cultural training should be supplemented with actual cultural immersion (e.g., Black, Gregersen, Mendenhall, & Stroh, 1999; Oddou, Mendenhall, & Ritchie, 2000; MacNab & Worthley, 2012). For instance, Mintzberg and Gosling (2002) argued that "managers cannot be created in the classroom" (65), and that cross-cultural training in particular requires "live cross-cultural experiences" (66). Furthermore, firsthand cross-cultural experience is important for developing *cultural intelligence* (Earley & Peterson, 2004)—the ability to grasp, reason, and behave effectively in situations characterized by cultural diversity (Earley & Mosakowski, 2004)—

which is essential for effectiveness in the global workplace.

Although businesses increasingly use international assignments as an effective tool for developing globally competent personnel (e.g., McCall & Hollenbeck, 2002; Caligiuri & Tarique, 2012), creating cultural immersion opportunities within the classroom is problematic. Universities increasingly offer international student exchange programs and internships to provide students with an opportunity to gain firsthand cultural experience. More commonly, however, international management (IM) education relies on *indirect* cultural experience through case studies, videos, and other means of illustrating real-world cultural interactions in a classroom setting. These indirect approaches have limitations, however, so class projects based on global virtual teams (GVTs) can provide students an opportunity to gain *direct* experience in working across cultures and time zones (e.g., Chappell & Schermerhorn, 1999; Clark & Gibb, 2006; Gavidia, Mogollón, & Baena, 2005).

Global virtual teams are geographically dispersed teams that use Internet-mediated communication to collaborate on common goals, and typically consist of members who have diverse cultural backgrounds and who have not previously worked together in face-to-face settings (Lipnack & Stamps, 2000). Global virtual teams are not only becoming a business necessity, but also present a unique learning context. Maznevski and DiStefano (2000) put forward a strong case for their use as an effective personnel development tool in organizations. We extend their argument and suggest that given their experiential nature GVTs can be a powerful tool in IM education. Collaborating with

peers across cultures and time zones provides students with authentic cross-cultural interaction without the typical time and financial costs associated with travel or study abroad.

The value of an experiential-learning approach in education, in general, has been explained theoretically (Kolb & Kolb, 2005) and demonstrated empirically (e.g., Tan & Chua, 2003; Nadkarni, 2003). Yet, to our knowledge, evidence regarding to the specific outcomes of using GVTs as a teaching tool in IM education is limited. We seek here to fill this gap by employing a multimethod approach (Kirkpatrick, 1975) to evaluate the effectiveness of GVT-based projects as a complex experiential-learning tool in IM education.

The research platform for this study was a large-scale student collaboration exercise that involved more than 6,000 students from nearly 80 universities located in 43 countries. The students worked in GVTs for about 2 months. Participants were enrolled in International Business, Management, Marketing, Entrepreneurship, Cross-Cultural Management and Communication, and related courses (for simplicity, we will use a general term "IM courses" hereafter). Multisource multilevel data were collected as a part of the project, providing the empirical base for investigating the impact of a GVT-based project on student attitudes, learning, behaviors, and performance. The insights from our study provide evidence for the usefulness of GVT-based approaches and facilitate a better understanding of the challenges and best practices of using this type of experiential learning in IM education.

THEORETICAL BACKGROUND

Cultural differences are a key factor in determining the functioning and success of international business operations (Magnusson, Baack, Zdravkovic, Staub, & Amine, 2008), which underlines the importance of developing cross-culturally competent managers. The concept of cross-cultural competence has substantially advanced in recent decades, from a focus on awareness of cultural diversity to an ability not only to recognize but also accept and genuinely appreciate cultural differences (Hammer, 2011; Johnson, Lenartowicz, & Apud, 2006) and leverage cultural diversity (Winkler & Bouncken, 2011; Zander, Mockaitis, & Butler, 2012). The focus of cross-cultural training has evolved from exploring and highlighting static differences between representatives of different cultures, to fostering mutual interest and appreciation

of differences, to developing collaboration methods that minimize the negative effects and harness the benefits of cultural differences (Matveev & Nelson, 2004).

Experiential activities have been increasingly included in the IM curriculum, but due to the prohibitively high cost, the use of global collaboration experiential projects as a learning tool had been very limited until recently. However, the latest developments in social media and on-line collaboration tools make this approach increasingly feasible and popular in IM education. In the next section, we review prior research on the use of experiential projects in education, particularly those involving global virtual collaboration. Then, drawing on the experiential learning (Kolb, 1984), social learning (Bandura, 1977), and intergroup contact (Allport, 1954) theories, we discuss how GVT-based projects aid learning in IM and contribute to development of cross-cultural competencies.

GVTs as a Learning Context

The rapid rate of globalization and the developments in information and communication technology have significantly changed the way work is conducted in organizations. Following the rise of reliance on virtual collaboration in the business world, academia has also adopted virtual technologies—initially in delivering distance learning, but eventually, as a means of enhancing the in-class experience of what has been dubbed as "the virtual generation" (Proserpio & Gioia, 2007). Teamwork, often used in class activities, has progressively expanded from in-person to over-the-Internet collaboration, and adding an international dimension, in particular in IM education, is a logical and inevitable next step.

The most obvious benefit of GVT-based projects lies in the opportunity to experience the challenges of working in multicultural virtual teams and practice how to deal with them. Such challenges include difficulties related to cross-cultural communication (Butler & Zander, 2008; Humes & Reilly, 2008); coordination and collaboration under the conditions of geographic dispersion and time zone differences (Sutanto, Kankanhalli, & Tan, 2011); differences in work styles (Liu, Magjuka, & Lee, 2008); and teamwork in low-media-richness communication environments (Flammia, Cleary, & Slattery, 2010). Global virtual teams, and international collaborative learning in general, have also been used to facilitate global learning in develop-

ing countries at low cost because specific web tools allow for collaborative experiences with students in other countries without the cost of travel (e.g., Langlois, Litoff, & Ilacqua, 2003; Cogburn & Levinson, 2008). However, evidence of the effectiveness of GVT-based projects is rather limited.

The limited number of extant studies that explored the effectiveness of GVT-based projects provides preliminary support for the value of using global collaboration exercises to enhance learning in IM courses. For instance, Chappell and Schermerhorn (1999) describe an early attempt to establish collaboration between undergraduate students from different countries (the U.S., Thailand, and Malaysia), and conclude that GVTs are cost effective in addressing the internationalization and the technology imperatives for management education. Similarly, Shea, Sherer, Quiling, and Blewett (2011) discuss their initiative of teaming up MBA students from South Africa with students from the United States as an exercise to facilitate understanding of team dynamics, opportunities, and challenges. Furthermore, using multiple case studies from business school programs in multiple countries (the U.S., Spain, and France), Gavidia, Mogollón, and Baena (2005) conclude that GVTs are a useful teaching tool. These studies, along with more recent ones (e.g., Zaugg & Davies, 2013), have also provided practical guidelines for using such activities in higher education.

Global virtual team-based projects have also been used successfully in other disciplines. For instance, based on a collaboration project between U.S. and Chinese international marketing students, Hu (2009) showed evidence that student participants had a better understanding of concepts and theories in international marketing compared to students who did not participate. Also, Zemliansky (2012) explored the dynamics and outcomes of a project where U.S. and Ukrainian graduate students of technical communication worked together and, as a result, improved their ability to recognize and adjust to the cultural and professional diversity in their teams.

Although the aforementioned studies offer some preliminary insights into the effectiveness of GVTs in IM education, they also reveal that, so far, the focus has been on confirming the general usefulness of GVT-based projects in the classroom or describing the general challenges and best practices associated with such activities. The theoretical insights into why and how GVT-based projects may enhance learning, and the empirical evidence on the more specific effects of these teaching tools

have been limited. Our work here seeks to provide theoretical insights and a more systematic empirical evaluation of the outcomes of global virtual collaboration in IM education.

Theoretical Perspectives on Learning in GVTs

As noted above, while the use of GVTs as learning and teaching tools has been discussed in the literature, no coherent theoretical rationale for why and how this approach may enhance learning has been formulated. We aim to provide a theoretical framework of GVT-based learning. We employ experiential-learning (Kolb, 1984), social-learning (Bandura, 1977), and intergroup contact (Allport, 1954) theories to show how global virtual collaboration aids development of cross-cultural competencies in a classroom setting.

Experiential Learning Theory

Participation in a GVT-based project first and foremost offers a "preview" of the real-world globally interconnected workplace. It offers a chance to experience firsthand the challenges of cross-cultural collaboration, to try what works and what does not, and as such, to engage in experiential learning relevant to international collaboration. As defined by Kolb (1984), *experiential learning* is a "holistic integrative perspective on learning that combines experience, cognition, and behavior" (21). Experiential learning has the potential to address the criticism of business education as being predominantly theoretical, passive, and unable to prepare students for practical challenges of the real world (Bennis & O'Toole, 2005; Rubin & Dierdorff, 2009).

A number of studies have provided evidence for the effectiveness of experiential learning in business education (Alon, 2003; Cheney, 2001; Krbec & Currie, 2010; Ng, Van Dyne, & Ang, 2009; Paul & Mukhopadhyay, 2005; Richards, 1997). The argument for using GVT-based projects in IM education hinges on the same logic. Particularly with respect to cross-cultural competencies, as argued by Earley and Peterson (2004) and Thomas, Lazarova, and Inkson (2005), cross-cultural interaction is essential in the development of cultural intelligence. Global virtual team-based projects not only offer an opportunity for such interactions, but also make cross-cultural interactions an inevitable part of the project. As such, GVT-based projects initiate the learning cycle by providing students with an opportunity to gain valuable, firsthand cross-cultural experience through guided

reflection in the classroom, coupled with an abstract conceptualization (via the knowledge content in the class) and support resembling the international exposure that students can typically gain only outside of the classroom.

As detailed by Kolb (1984), the learning cycle includes experiencing, reflecting, thinking, and acting. Experiencing provides the foundation for the cycle. Global virtual collaboration provides an excellent opportunity for all stages of the cycle, but is particularly important from the perspective of experiencing and acting—the two elements of the learning cycle that are often missing in the classroom. Coupled with instructor-facilitated activities that encourage reflecting on the experiences and thinking of better ways of completing the tasks, GVT-based projects facilitate the complete learning cycle—experiencing, reflecting, thinking and acting—with a focus on aspects related to cross-cultural learning and competence development. Particularly if GVT-based projects last for a sufficiently long time period (such as several weeks or longer) and are structured around multiple deadlines for related assignments and tasks, then students involved in these projects will have the opportunity to go through the whole learning cycle multiple times over the course of the project.

Social Learning Theory

Much of our learning occurs in a social context, by observing and imitating others (Bandura, 1977). Based on the social-learning perspective, the behavior of individuals and the context in which learning takes place are both causing and affecting each other. This fundamental principle of reciprocal determinism is part of the GVT fabric: Team members both generate, and are affected by, the norms of the team. Global virtual teams are particularly learning-inducing because individual pre-existing norms for working with others will most likely vary across team members. As Maznevski and DiStefano (2000) explained, when team members interact with each other, they inevitably learn about each other's preferences and start making connections between behavior and culture. Not all such inferences will be correct, but members of the team inevitably engage in solving the puzzle of why people behave as they do and have plenty of opportunities to test and refine their hypotheses about the link between culture and behavior. According to social-learning theory, attention is one of the essential conditions for mod-

eling, and implicitly, for learning. Global virtual teams members have to compare and contrast what they know and what they think is best with similar information from others, and they inevitably have to pay attention to the behaviors of others and to the norms of the team.

Another facilitating factor for learning is motivation to imitate and model behaviors. In the case of GVT-based projects, students are typically motivated to engage efficiently with the team due to both social pressure (in order to be considered as contributing members of the team and to "fit in") and potential incentives or punishments (such as lower grades due to low peer evaluations and low performance of the team). Similar to global business teams, student teams have to achieve a common goal (i.e., the assigned project task). Consequently, the team will be forced to bring together different perspectives and knowledge (i.e., "integration"), which facilitates the cognitive complexity that is often regarded as the basis of cross-cultural competence (e.g., Johnson et al., 2006).

Interacting with fellow members of a GVT expands students' repertoire of behaviors and attitudes beyond what is typical for their own culture. Furthermore, if the team has functional diversity, students also have an opportunity to gain knowledge from different functional areas. Indeed, most likely students will have a slightly different background in terms of courses taken, work experience, and so on, and this will further facilitate a broader range of new information to be shared, transferred, and assimilated. In order to absorb the new knowledge, attitudes, and behaviors, students must have ample opportunities to practice different responses and evaluate their effects. It is exactly this feature that may position GVTs as superior to other experiential class activities because they typically involve a longer span of time (part of, or an entire semester) with multiple (rather than one-time) interactions.

Based on a more detailed evaluation of these processes, Maznevski and DiStefano (2000) described GVTs as an ideal context for developing global leadership skills. As we noted above, we believe that GVTs cannot only be used as leadership development tools, but also a broader range of cross-cultural competencies, and that they can be equally effective the classroom.

Intergroup Contact Theory

Intergroup contact theory (Allport, 1954) provides further insights into how the use of GVT-based

projects can facilitate learning and development of cross-cultural competencies. It postulates that lack of interaction between representatives of different cultures leads to prejudice and conflict. As best summarized by Brameld (1946: 245), "when groups are isolated from one another, prejudice and conflict grow like a disease." In contrast, frequent contact promotes understanding, tolerance, and interest in further interaction.

The idea that contact reduces prejudice and conflict and aids intergroup cooperation dates back to the early 20th century. Zelig and Hendrickson (1933) studied the attitudes of Caucasian children toward 39 different ethnic groups and found a positive relationship between cross-cultural tolerance and the degree of prior contact and acquaintanceship with representatives from these groups. In subsequent decades, more studies explored this phenomenon and provided further evidence that intergroup contact aids cultural understanding and competence (Sherif, Harvey, White, Hood, & Sherif, 1961; Smith, 1943).

Although the intergroup contact theory was originally used in the context of interracial prejudice, it was later successfully applied to explain and alleviate conflict and promote understanding among groups with different views on political, religious, and sexual orientation issues (for a review, see Pettigrew & Tropp, 2006). We propose that intergroup contact is equally important in IM education and cross-cultural competence development.

Difficulties in dealing with the unknown and the associated fear and rejection of strangers or outgroups is an inherent tendency of humans and animals, and therefore, constitutes a major hindrance to international workgroup collaboration (Bochner, 1982; Jarvenpää & Leidner, 1998). Throughout the course of evolution, limiting interaction with representatives of outside groups, whether other tribes or other species, was associated with limited exposure to danger and increased chances of survival (Thayer, 2000). Indeed, active display of prejudice and hostility toward outsiders aided survival, as such behaviors highlighted devotion to and increased chances of acceptance and protection by one's own group (Dawson, 1999).

Although xenophobia was associated with increased chances for survival of early humans, in current times, it is a major hindrance to cross-cultural collaboration. The inherent tendency to avoid and reject outgroups limits interaction with outsiders, thereby limiting sharing and learning of

information and knowledge beyond one's own group. Intergroup contact helps remedy the problem by providing an opportunity to share information among different groups.

Allport (1954) formulated four conditions under which intergroup contact would be most effective: (1) equal status within the contact situation; (2) cooperation between representatives of different groups; (3) common goals; and (4) support of authorities. Global virtual team-based projects satisfy all four conditions: The team members are of equal (student) status; the task generally requires cooperation toward a common goal; and the activities are supported by authorities (instructors). Thus, such projects provide an excellent platform for educational and constructive intergroup contact.

Cross-cultural interactions among the members of GVTs aid forming a richer and more detailed picture about the other (Brown & Hewstone, 2005). The additional information about the other group not only allows for more accurate interpretation of cues and more efficient and effective collaboration, but also reduces the unknown, which in turn limits fear and prejudice. As representatives of different groups learn more about each other, they discover shared interests and commonalities, which cultivates interest in future interactions. Further contact leads to further information exchange and the learning of best practices of intergroup collaboration.

The available empirical evidence provides initial support for the effectiveness of international collaboration in cross-cultural competence development. Research into inter-ethnic prejudice shows that interaction with representatives from other racial and cultural groups reduces perceived differences and conflict, improves tolerance and interest in further interaction, and enhances the effectiveness of communication and collaboration across groups (Blanchard, Adelman, & Cook, 1975; Bochner, 1982; Brameld, 1946; Brewer & Kramer, 1985; Sherif et al., 1961). Based on both social-learning and intergroup contact theories, a study by Caligiuri and Tarique (2012) found that cross-cultural experiences increase tolerance for ambiguity, develop cultural flexibility, and reduce ethnocentrism, which in turn facilitates global leadership effectiveness. Likewise, Leiba-O'Sullivan (1999) found that experiential learning in international teams can break stereotypes, improve information exchange and knowledge about out-

groups, and foster development of cross-cultural competences.

Evaluating the Effectiveness of GVT-Based International Collaboration Projects

Empirical research into the effectiveness of GVT-based experiential learning as a part of IM education is limited. In the rare cases when such projects were evaluated, the assessment was generally limited to subjective perceptions of the faculty or students about the effectiveness of the approach (for a review, see Gosen & Washbush, 2004). To advance our understanding of the issue, more rigorous assessment is needed, with the learning outcomes measured experimentally, by way of the use of control groups, and at various levels of training over time (cf. Burke & Hutchins, 2007).

To that end, we evaluate the effectiveness of GVT-based experiential learning in IM education using Kirkpatrick's (1975) classic model of training evaluation. The model evaluates the outcomes of training at four levels: reactions, learning, behaviors, and results. Questions have been raised about the assumed ascending order of the four levels of Kirkpatrick's model, the causality links between the levels, and the positive intercorrelations between them (e.g., Alliger & Janak, 2006). Nonetheless, the model has been widely used by training professionals as a framework to evaluate training effectiveness in an organizational context, which includes evaluating teaching effectiveness in higher education (Praslova, 2010).

STUDY CONTEXT AND METHOD

The X-Culture Project was used as a research platform for the present study (www.X-Culture.org). X-Culture is a large-scale GVT-based activity where students work in teams to collectively complete a course project. The project was launched in 2010. As of January 2013, over 6,000 students have participated in X-Culture, with the numbers reaching up to 2,000 participants from over 80 universities in 43 countries on all inhabited continents in a given semester. Master's and undergraduate students take part in the project, with the former accounting for about 30% of the participants. With the preproject training and the postproject presentations, X-Culture takes up most of the semester; however, the active collaboration window (i.e., the time when the team members work directly with one another) usually spans about 2 months.

Working in GVTs of about seven students from different countries, project participants develop a business proposal for a company of the team's choice. Although the expectations and the requirements of the final report are spelled out in great detail, and a number of deadlines have to be met, the teams have autonomy with respect to their choice of communication mode and frequency, team coordination and leadership, workload distribution, and other aspects of teamwork.

The particulars of the task vary each semester, but the core task is to develop an idea for a new economically viable product for the client company, conduct an opportunity analysis and choose a market where the product is most likely to be successful, and write a new market entry plan that details the recommended market entry mode, staffing, and marketing strategies. While a real company must be chosen as a "client," the company is usually not directly involved in the project. Nevertheless, a number of companies partner with X-Culture and present real-life international business challenges that the student teams try to address in their business proposal.

For the vast majority of the students, the X-Culture Project is a required part of their course, and the project accounts for 20–35% of their course grade. Some instructors offer an alternative assignment option for the students who lack working language skills or are not interested or able to participate in the project for other reasons.

Furthermore, a few students participated in X-Culture twice, and some took multiple courses from instructors who included X-Culture in more than one of their courses. Also, students who participated in the project in 2011 were allowed to participate again in the late 2012 round on a voluntary, not-for-credit basis. This resulted in a group of 41 students who completed the project twice. The first-timers and returning students did not differ significantly in terms of their demographics. The returning students were distributed across teams of first-time participants; that is, there were 41 teams with a returning student in them.

Multisource multilevel data on team composition, processes, and outcomes were collected throughout the project. The data sources included student and instructor surveys (administered before, during, and after the project), peer evaluations, team report quality assessments by instructors and by students from other teams, plagiarism statistics provided by Turnitin, student course

evaluations, project records on meeting individual and team deadlines, and correspondence records.

Per Kirkpatrick's (1975) model, training effects are evaluated separately at the levels of reactions, learning, behaviors, and results. To keep our analyses more focused, we slightly deviated from Kirkpatrick's original model. Given the importance and the distinct role of attitudes and perceptions in a cross-cultural context, we measured attitude and perception changes separately from learning. Thus, we present our findings in five sections: (1) Assessment of Reactions; (2) Assessment of Learning; (3) Changes in Attitudes and Perceptions; (4) Changes in Behavior; and (5) Assessment of Performance.

Assessment of Reactions

Perceived Effectiveness of GVT-Based Activities

Several tests were performed to evaluate students' reactions to the X-Culture Project. First, students who participated in X-Culture in 2010 and 2011 were asked to provide open-ended comments on their experience with the project: 936 students provided such feedback. The data were independently coded by four researchers. In cases of disagreement, the coders jointly agreed on the best code. The resulting interrater reliability was 85%.

The student feedback was encouraging with regard to perceptions of the effectiveness of the global virtual collaboration exercise. While not explicitly prompted in the open-ended question, 226 respondents (28.5%) described the project as a positive experience. Their comments usually included positive overall evaluations of the project (e.g., "great experience," "brilliant idea," "wonderful, practical initiative") and perceptions of enhanced learning ("the project was an eye opener"), but also specific references to improved teamwork skills ("I have learned a lot especially working with people I have never met") and cross-cultural skills ("I'm sure I will be better prepared next time I work with people all over the world"). In contrast, only 4.8% of the respondents evaluated the international collaboration exercise as a negative experience, mainly as a result of inherent challenges specific to their teams. Some found the project "frustrating" and "time-consuming," particularly in terms of managing team collaboration. However, most students appreciated these challenges as learning opportunities.

To better gauge the participants' reactions, in particular their perceptions of how useful the international collaboration project was for their future careers, the following question was added to the postproject survey in late 2011: "Do you feel the project helped you learn and was useful for your future career?"¹ A 5-point scale was used to measure respondents' perceptions of the utility of the project (from 1 = *Completely useless, I didn't learn anything* to 5 = *Very useful, I learned a lot*). Based on 3,023 responses collected, the average rating was 3.86 ($SD = 1.06$), roughly placed between "*Somewhat useful, I learned something*" and "*Very useful, I learned a lot*." The distribution was not normal: 35.36% chose the highest response option (5) and 28.82 and 27.09% chose 4 and 3, correspondingly. Although the numbers indicate that 91.27% found the experience to be "*somewhat useful*" to "*very useful*," it must also be noted that 2.38 and 6.34% of the participants felt the experience was "*completely useless*" and "*not very useful*," respectively. While the negative evaluations were extremely rare compared to the number of positive responses, they reveal that experiential projects of this type are no panacea and that some, albeit few, students find this teaching approach ineffective. However, it is clear that overall, students' reactions to the GVT-based project were overwhelmingly positive.

Course Evaluation

Recognizing the limitations of the reaction evaluation as described above, we also conducted a control versus treatment group comparison to see how the use of GVTs affects student satisfaction with the course overall. Several instructors taught multiple sections of their courses and used the X-Culture Project in some of them and an alternative assignment in others. Admittedly, the assignment of students to the treatment and control groups was not random: The course design differences occurred due to various administrative reasons. This natural experiment, however, presented an opportunity to test the effects of the interna-

¹ Please note that the question combines two potentially independent constructs: learning and usefulness. In theory, one can learn, but the learned knowledge or skills may not be useful. This potential inconsistency embedded in the question calls for caution when interpreting these findings; however, based on the trainees' answers to the question, it is clear that their reactions to the training were overwhelmingly positive.

tional project on students' perceptions of the course quality and utility.

Table 1 summarizes our findings, which speak strongly in favor of the experiential-learning project. When X-Culture was part of the course, the student evaluations were significantly more positive across all evaluation dimensions, regardless of the country or level of the course (except in one undergraduate course, where there was a slight drop in ratings on one dimension only). The students rated the course as more satisfactory even on such dimensions as course organization, in spite of the fact that the X-Culture Project adds significant complexity to the structure of the course.

Instructor Reactions

To limit the effect of the same-source bias, we also asked the instructors to provide their reactions to the X-Culture Project. Similar to the assessment of student reactions, in 2011, 49 instructors provided qualitative feedback that was coded using the same procedures described above. The data suggest that most instructors believe that the X-Culture Project enhanced learning in their class: The ratings in achieving this set goal (expressed as the reason for joining the project) ranged from 51 to 100% achieved, with an average of 80%. The lower ratings of achieving this goal were associated with joining the project primarily for other purposes (i.e., research opportunities and inter-institutional or interpersonal networking). When the level of achievement is corrected for the importance attributed to the specific goal, the extent to which the goal of enhanced learning was achieved increases to 91%, while the other goals (research and networking) were achieved beyond the level expected. Notably, perceptions of achieving the goal of enhanced learning also seem affected by the class size. The rating for the extent to which the goal of enhanced learning was achieved was in general lower in larger classes.

Furthermore, in 2012, instructor perceptions of the ability of the project to enhance learning in their courses were assessed quantitatively. After completing the project, the instructors were asked to rate the extent to which the learning in their course was enhanced through the X-Culture Project (1 = *not at all* to 10 = *very much*). A total of 101 instructors completed the survey, providing an average rating of 7.87 ($SD = 1.97$), which roughly corresponds to "the project considerably enhanced learning in my course."

Assessment of Learning

We analyzed how participation in X-Culture affected knowledge acquisition, particularly knowledge relevant to the IM context. Three types of learning were assessed. First, students' cultural intelligence was evaluated before and after their participation in the international collaboration project. Second, a before-and-after comparison of expected versus observed challenges of global virtual collaboration was conducted to see whether the students' perceptions and understandings had changed over the course of the project. Presumably, firsthand experience improves understanding of the challenges and creates a foundation for developing best practices of global virtual collaboration. Thus, a change in the students' understanding of the problems after the project, compared to that before the project, would indicate learning. On the other hand, no differences in how the students see the problems associated with working virtually before and after the project would indicate that no learning has occurred: Either the students had a strong understanding before the project, and thus, no room for improvement existed, or the initial understanding was limited but did not improve over the course of the project. Third, using a control versus treatment group comparison, the students who participated in the X-Culture Project were compared to those who did not in terms of their performance on their course exams and assignments. The expectation was that following participation in the X-Culture project, students' cultural intelligence would improve, and that compared to the students who did not participate in the project, those who participated would perform better on the knowledge tests that are part of their IM courses.

Cultural Intelligence

The Motivation subscale of Ang et al. (2007) was used to assess cultural intelligence.² Students were asked to what extent they, for example, enjoy interacting with people from different countries,

² The other subscales were not used due to their limited relevance in the GVT context. For example, the Behavioral subscale focused on communication patterns that are rarely applicable to virtual communication context (e.g., items referring to behaviors such as "I alter my facial expressions. . ." and "I use pause and silence differently. . ."). Video-conferencing was not a requirement in the project, and most teams relied on text-based communication media.

TABLE 1
Comparison of Course Evaluations in the Control vs. Treatment Conditions

Dimension/condition	Control No X-Culture	Treatment X-Culture	Difference
<i>Ecuador, MBA</i>	<i>N = 41</i>	<i>N = 36</i>	
Level of accomplishments of the course objectives	4.00	4.34	0.34
Importance of the topics developed in class	4.00	4.31	0.31
Theory–practice equilibrium	3.78	4.17	0.39
Pertinence of the contents	3.98	4.34	0.36
The teacher masters the topics	4.20	4.40	0.20
Clarity of exposition	4.05	4.40	0.35
Materials and visual aids	4.02	4.20	0.18
Work pace	3.88	4.14	0.26
Teacher’s attitude and way of answering questions	4.24	4.44	0.20
Class and teacher were organized and planned	4.27	4.37	0.10
Class average	4.04	4.31	0.27
<i>United States, NC, undergraduate</i>	<i>N = 656</i>	<i>N = 1,240</i>	
Provided prompt, informative feedback	4.48	4.66	0.18
Communicated expectations, maintained high standards	4.35	4.49	0.14
Enthusiastic about the subject	4.53	4.70	0.17
Teaches in organized manner	4.33	4.61	0.28
Uses variety of teaching techniques to facilitate learning styles	4.10	4.47	0.37
Facilitates atmosphere of mutual respect among students and the instructor	4.37	4.55	0.18
Encourages students to be actively involved learners	4.45	4.59	0.14
Encourages faculty–student communication in and outside the classroom	4.34	4.47	0.13
Encourages to devote sufficient time and energy to the coursework	4.38	4.48	0.10
Develops ways for students to work together to learn cooperatively	4.39	4.59	0.20
Cares about students’ academic success and welfare	4.36	4.57	0.21
Overall performance of the instructor in the course	4.28	4.57	0.29
How satisfied are you with what you have learned in this course?	4.10	4.43	0.33
Class average	4.34	4.55	0.21
<i>Poland, undergraduate</i>	<i>N = 89</i>	<i>N = 62</i>	
Lecturer’s preparation	5.00	5.00	0.00
Issues were discussed in an understandable way	4.92	4.97	0.05
Issues were discussed in an interesting way	4.86	4.96	0.10
Course examination was consistent with class policy	4.90	4.92	0.02
Lecturer’s involvement in the course	4.90	4.92	0.02
Examination form was easy to understand	4.96	5.00	0.04
Class average	4.93	4.98	0.05
<i>United States, IL, undergraduate</i>	<i>N = 16</i>	<i>N = 28</i>	
Intellectually challenging and stimulating	3.80	4.50	0.70
Learned something valuable	3.93	4.00	0.07
Interest in the subject increased after course	3.93	4.33	0.40
Learned and understood the course material	4.00	4.52	0.52
Instructor was enthusiastic	4.33	4.72	0.39
Instructor’s presentation style	4.07	4.52	0.45
Clarity of instructor’s explanation	3.53	4.47	0.94
Course materials were well-prepared	3.88	4.52	0.64
Course objectives were followed	3.87	4.40	0.53
Encouragement to participate in discussions	4.47	4.43	–0.04
Encouragement to share ideas and knowledge	4.27	4.60	0.33
Encouragement to ask questions and meaningful answers	4.13	4.26	0.13
Instructor made students feel comfortable in seeking advice	4.40	4.63	0.23
Class average	3.88	4.59	0.71
<i>United States, IL (2), undergraduate</i>	<i>N = 30</i>	<i>N = 30</i>	
Overall evaluation	4.58	4.68	0.10
<i>Italy, undergraduate</i>	<i>N = 30</i>	<i>N = 50</i>	
Overall evaluation	4.29	4.59	0.30

are confident that they can socialize with locals in an unfamiliar culture, can deal with the stress of working with people from other cultures, enjoy working with people from unfamiliar cultures, and become accustomed to working conditions in a different culture. Cultural intelligence was tested before and after the students completed the project. A 5-point scale was used (higher scores indicated higher cultural intelligence). The Cronbach's alphas for the construct were 0.79 and 0.83 for the pre- and postproject surveys, respectively.

Based on a total of 3,355 usable responses, before the project started, the students' cultural intelligence averaged 2.46 ($SD = 0.86$), while it rose to 2.56 ($SD = 0.96$) following the project. The 0.10 point increase in cultural intelligence is statistically significant ($p < .01$) and an encouraging outcome.

Expected Versus Observed Challenges

Using the same qualitative dataset used to assess reactions, we compared the most commonly cited "expected" versus "observed" challenges in the pre- and postproject survey, respectively. As

shown in Table 2, students' understanding of challenges associated with global virtual collaboration evolved considerably over the course of the project. Prior to the project, cultural, language, time-zone differences, and other communication barriers were most commonly expected to hinder performance of the team (20.5–28.2%), while coordination problems were much more rarely expected as challenges (16.2%). Following the project, the expectations were largely reversed with fewer students seeing cultural diversity, language differences, time-zone differences, and other communication barriers as a problem (2.9%, 7.0%, 15.5%, and 11.1%, respectively). Instead, after the experience, coordination was seen as the biggest challenge (34.8%).

Also, in 2012, students' perceptions about the challenges of global virtual collaboration were assessed quantitatively. The results of a quantitative measurement were consistent with those obtained based on the qualitative data in the earlier seasons of X-Culture. A total of 4,271 students provided responses usable for before and after project comparisons. As summarized in Table 3, there was a

TABLE 2
Expected vs. Observed Challenges, Qualitative Data

Challenge	Expected	Observed	Examples of quotes from pre- and postproject surveys
Cultural differences	28.2	2.9	"Differences between cultures and people will be a challenge"; "Each culture was so different, I couldn't do project well"
Language differences	21.2	7.0	"For some people for whom English is not their mother-tongue, communication might be a challenge because message delivered can be misunderstood or distorted"; "Since I had to decipher their cryptic English and the meaning of their sections it took me countless hours to get this project in an acceptable format to submit and create content that would make sense"
Time-zone differences	20.6	15.5	"Time differences, when discussing an issue (probably via email) it will take a long time. In addition, to make a decision of several people from different places will be a very hard task"; "It was also a challenge to find a good working tool because of the time difference between the countries of every teammate"
Other communication barriers	20.5	11.1	"Problems with communication"; "They just wanted to communicate via Skype. I tried multiple times to contact them through email but they would never respond with any information that was useful"
Coordination	16.2	34.8	"I think the group work will be the biggest challenge of a project, it will be difficult to ensure everyone will contribute or do smoothly"; "It was hard getting prompt replies from team members. Sometimes, the email wouldn't work. Or they would respond back days later"

Note. The ratings reflect the percentage of students who mentioned the challenge in their open-ended summary of expected and observed challenges.

TABLE 3
Expected vs. Observed Challenges,
Quantitative Data

Challenge	Expected	Observed	Difference
Language differences	2.97	1.89	1.08
Time-zone difference	3.39	2.80	0.59
Other communication challenges	2.66	2.10	0.56
Skill level differences	2.49	1.89	0.60
Opinion and value differences	2.85	2.01	0.84
Stereotypes and prejudice	2.43	1.41	1.02
Coordination	2.40	3.72	-1.32

Scale: 1 = *not a challenge at all*; 5 = *very big challenge*.
 All differences significant at $p < .01$

significant drop in students' expectations that language and other communication barriers, differences in values, opinions, working styles, geographic and time-zone dispersion, stereotypes and biases hinder performance in GVTs. In contrast, coordination was expected to be less of a challenge before the project started, but was seen as a major problem following participation in the project. Clearly, participation in the international collaboration project significantly affected, and hopefully improved, the students' understanding of challenges faced by GVTs.

Course Test Performance

Three instructors who taught multiple sections of the same course—some sections with and some without X-Culture (treatment vs. control condition)—used identical examinations in the different course sections to evaluate their students' knowledge of the course material. Since the only difference among the course sections was the use of X-Culture versus alternative assignments, the evaluation of the student performance in these different sections allowed for a comparison of the student learning in the control and treatment conditions.

It is important to note that until the semester started, the students had no way of knowing which sections of the course would participate in X-Culture; therefore, self-selection was likely not a factor. However, as it usually happens, a few students (1–3 per course section) dropped the course in the first weeks of the semester, so selection attrition was theoretically a possibility. However, given that the number of dropouts was approxi-

mately equal in both the control and treatment conditions and not noticeably different from what is observed in any given semester, and because the attrition numbers were very low, it is extremely unlikely that selection bias poses any threat to the validity of the findings.

As shown in Table 4, students in the treatment condition (course sections with X-Culture) did better on the exams by 1.75% (United States data) and 3.50% (New Zealand data) than the students in the control condition (no GVT project). The differences, although not dramatic, were statistically significant ($p < .01$). There was only one exception to this overall finding: In an MBA course taught in the United States, students in the treatment condition had an overall lower performance than those in the control condition. The difference was less than 1%, but also statistically significant ($p < .01$). However, in this group the students in the control condition performed better in the first exam (given before the start of the GVT project), while the students in the treatment condition (those who had X-Culture) performed better in the second exam (given at the end of the semester). The difference in the first exam (pre-GVT project) was greater than that in the second exam (post-GVT project), shifting the overall average in favor of the control condition. However, if the timing of the exams is considered, even this exception speaks in favor of GVT-based projects: After the underperforming part of the class started collaborating with their peers around the world, they outperformed the control group that initially performed better.

Changes in Attitudes and Perceptions

Changes in several types of attitudes and perceptions relevant to international collaboration were evaluated. First, before and after the project, the students were asked to report their perceived ease or difficulty of working with people from different countries. As predicted by social-learning (Bandura, 1977) and intergroup-contact (Allport, 1954) theories, we expected to observe a reduction in the perceived differences and perceived difficulty of working with people from different countries as a result of interaction during the GVT project. A reduction in the perceived differences would reduce stereotyping and biases and improve team dynamics, while an adjustment in perceptions of difficulty of collaborating cross-culturally would aid forming more realistic expectations with respect to what it takes to succeed on a task requiring inter-

TABLE 4
Comparison of Test Performance in the Control vs. Treatment Conditions

	Control (no X-culture)			Treatment (X-culture)				
	N	Exam 1	Exam 2	Exam 3	N	Exam 1	Exam 2	Exam 3
Undergraduate, USA								
66	79.6	78.24	79.41	149	78.40	78.00	79.60	
187	72.03	75.24	82.16	56	79.80	78.20	78.00	
146	73.25	74.34	79.62	154	80.20	81.90	78.80	
				130	79.00	80.70	78.60	
				174	78.40	71.60	81.40	
				207	74.50	79.50	82.69	
<i>Total</i>			77.09				78.84	
<i>Difference</i>							1.75*	
Master's, USA								
9	30.61	33.00		17	26.99	35.65		
<i>Total</i>			31.81					31.32
<i>Difference</i>								-0.48*
Undergraduate, New Zealand								
50	64.4	60.08	64.22	53	68.30	66.71	70.80	
				43	66.60	59.99	66.00	
<i>Total</i>			62.90				66.40	
<i>Difference</i>							3.50*	

* Significant at $p < .01$

national virtual collaboration; such changes would, in turn, affect how seriously the task is taken and how GVT members prepare for and interact with one another while performing the task.

Perceived Cultural Differences and Impact on Collaboration

In 2011, the X-Culture participants were offered a set of pre- and postproject items that listed 40 country pairs and were asked to rate the extent to which they believed the cultures of each country pair were similar or different. The responses were rated on a 5-point scale (1 = *No difference*, 5 = *Very different*). In addition, we used a simpler approach in 2012 to measure perceived cultural differences. Rather than rating perceived differences between countries in predetermined country pairs, we asked the respondents to evaluate cultural differences among all countries represented in their team. The data were collected separately before and after the students completed the project. A total of 3,266 students completed the pre- and postproject surveys.

Similar to the measures of perceived cultural differences, students were also asked to rate the extent to which they expected that people from these different countries would have difficulties

working together. In 2011, a total of 1,943 students rated their perceptions about difficulties people from each country pair would have working together, rated separately before and after the project. In addition, in 2012, a total of 3,266 students completed a simpler version of the survey that directly asked how easy or difficult, in their opinion, it would be for people represented on their team to work together, given their cultural differences (1 = *No problems working together*, 5 = *Great difficulties working together*).

The before and after project responses were compared. As shown in Table 5, participation in the project led, as expected, to a statistically significant drop in perceived intercultural differences across all samples and measures. Also of interest, based on the 2011 data, the change in perceived differences was virtually identical regardless of whether the countries in the question were represented on the respondent's team. That is, cross-cultural interaction lowered perceived differences among cultures *in general*, that is, not only for the cultures with which the students had direct contact in their teams.

With respect to perceived difficulties in interacting with people from other cultures, no significant change in perceptions was observed based on the 2011 data when students were presented with 40

TABLE 5
Change in Perceptions About Cultural Differences and Cross-Cultural Collaboration

Measure	Before		After		Change
	N	M	N	M	
<i>Perceived cultural differences</i>					
Ratings of 40 country pairs	1,943	3.66	1,941	3.41	-0.25**
Ratings for countries represented on the team	3,033	3.81	3,034	3.29	-0.52**
<i>Perceived difficulties of cross-cultural collaboration</i>					
Ratings of 40 country pairs	1,942	2.95	1,940	2.97	0.02
Ratings for countries represented on the team	3,266	2.93	3,262	2.84	-0.09**

Scale: 1 = no difference at all; 5 = very big difference. ** $p < .01$

predetermined country pairs. However, based on the 2012 data, when students were simply asked about the perceived difficulties people from the cultures represented on their team would have when working together, there was a statistically significant drop ($p < .01$), albeit much smaller than the one observed in perceived cultural differences.

Changes in Behaviors

Using a series of tests relying on self-report and observed data, we sought to evaluate how the knowledge acquired during the international collaboration exercise affected the project participants' behaviors. That is, we asked whether, when working on a similar task in the future, the students would approach the problems and behave differently.

First, all participants were asked whether they would do anything differently to achieve better performance if they were to complete another GVT project, and if so, what that would be. The question was included in the postproject survey in 2011 and 2012, with a total of 5,324 students providing their answers. Of those, 4,909 (92%) indicated that they would change their behavior and handle the project differently. Most students listed 3–5 areas where they felt a different behavior would lead to better performance. Consistent with the changes in the students' understanding of the challenges of global virtual collaboration discussed above, most students shared that the next time they would devote more attention to the technical aspects of coordination, such as laying out team collaboration rules early on in the project, being much more proactive with respect to decision making, procrastinating less, checking progress of their team members more often and communicating more frequently, creating a group in Facebook or Google+

early on in the process, as well as relying more on advanced virtual collaboration tools such as Google Docs.

Recognizing that the validity of the self-reported expected changes in behavior is questionable, we subsequently addressed the issue experimentally. As mentioned earlier, 41 students participated in X-Culture twice. Unfortunately, following research ethics guidelines, we de-identify our data once they are added to the larger database at the end of each season, which precludes matching the different sets of records for students who participated multiple times. However, we were able to compare the behavior of the returning students to that of first-time participants in a particular season. The differences, presumably, are a result of the experience and knowledge the returning students had gained when participating in the project for the first time. The available records allowed us to compare how the returning students differed from the rest of the participants with respect to such behaviors as team governance (leadership and coordination), communication (mode and frequency), and procrastination.

As summarized in Table 6, there were substantial differences between the behaviors of students who participated the first time and those who had prior experience in global virtual collaboration. The returning students tended to be much more proactive with respect to leadership and coordination, precisely the areas that, as discussed earlier, most students reported they would approach differently if they were GVT members again. Specifically, the teams with returning students were significantly more likely to have a team leader, formal or informal. Moreover, the returning students were more likely to take the formal or informal leader roles and were less likely to act as passive team members.

TABLE 6
Behavioral and Performance Differences, Newcomers vs. Returning Students

	New	Returning	Difference
<i>N</i>	1,299	41	
<i>Behaviors</i>			
Communication tools use			
Google docs ^a	2.50	2.88	0.37*
Facebook ^a	3.74	4.90	1.16*
Dropbox ^a	1.68	1.29	-0.39*
<i>Communication frequency and duration</i>			
E-mails sent	16.66	19.49	2.82*
E-mails received	18.23	23.49	5.26*
Chat, number of conversations	16.57	18.61	2.04*
On-line text chat, number of messages	19.66	25.27	5.61*
On-line text chat, minutes	57.03	66.05	9.02*
Voice conferencing, number of conversations	2.26	1.22	-1.04*
Voice conferencing, minutes	6.73	6.85	0.12
Video conferencing, number conversations	7.40	0.27	-7.13*
Video conferencing, minutes	3.65	3.39	-0.26*
<i>Leadership and team coordination</i>			
Team had a formal leader, %	25.51	34.15	8.64*
Team had an informal leader, %	22.50	24.39	1.89*
<i>Own role</i>			
Formal leader, %	3.05	4.58	1.53*
Informal leader, %	24.55	29.27	4.72*
Follower, %	17.43	7.32	-10.11*
<i>Procrastination</i>			
Average time before deadline (eight deadlines), hours	3.80	10.12	6.32*
<i>Performance</i>			
Peer evaluations, (1-5, 5 = very good)	3.79	4.02	0.23*
Report quality (1-7, 7 = very good)	4.74	4.81	0.07
Report similarity (suspected plagiarism) rate, %	0.21	0.21	0.00

^a Frequency of use: 1, never, 3, once a month, 6, every day. * $p < .05$

In terms of their choice of collaboration mode, there were also notable differences between the two groups. The returning students were significantly more likely ($p < .01$) to use advanced international collaboration tools, such as Google Docs and Facebook, although they were significantly less likely to use Dropbox ($p < .05$). As one of these students explained in additional comments, his prior experience showed that Dropbox was a poor choice as it works best when installed on the computer, which was not an option for his team members who had to rely on university computer labs to access the Internet. In contrast, Google Docs and Facebook groups work directly in a web browser, which makes them more universally accessible.

Furthermore, the returning students communicated with their teammates significantly more ($p < .01$ across all communication modes). They reported sending and receiving more e-mails, spending more time in on-line chat rooms, and sending more instant messages (e.g., Facebook

chat). They reported having slightly fewer voice conversations (e.g., Skype), but their conversations were longer. Also of interest, returning students video-conferenced less, which may suggest they were more focused on the task and less on the interpersonal aspect of collaboration.

Finally, the returning students procrastinated less or were more efficient in their work. On average, they completed each project component (8 deadlines in total) 10.12 h before the deadline, compared to only 3.80 h before the deadline for the rest of the group ($p < .01$).

Assessment of Performance

To assess whether the improved knowledge and changes in attitudes and behaviors led to improved results, the performance of the returning students (the sample described in the section above) was compared to the performance of the

students who participated in X-Culture for the first time.

First, we compared the quality of the business plans. The business plans prepared by the teams of the returning students were rated by the instructors more favorably (each report was rated independently by 4–6 instructors and the ratings were averaged to obtain the total score). The difference was generally small and not always statistically significant (0.07–0.41 on a 7-point scale), but consistent across the nine quality evaluation dimensions. The results suggest a positive and lasting effect of GVT experience on future performance, although it is conceivable that the differences were not due to improved cross-cultural collaboration competencies of the second-timers, but to other factors such as, for example, their improved business plan writing skills.

Therefore, we further compared peer evaluations. Peer evaluations were multidimensional and included assessment of effort, helpfulness, communication skills, intellectual contribution, help with team coordination, help with writing the report, as well as overall contribution and performance. As expected, the returning students were rated higher by their team members. The differences were not large, but consistent and statistically significant ($p < .01$) across all seven peer-evaluation dimensions, with an average difference of 0.23 on a 5-point scale. The better peer evaluations of the second-timers suggest that their prior experience led to improved international collaboration competencies. Evidently, they were more liked and respected by their teammates than those who participated in the project for the first time. This does not completely rule out a possibility that the higher peer evaluations were partially due to improved writing skills or other competencies not related to international collaboration. However, it is very likely that the main or at least one of the reasons for the observed differences was that prior participation in the GVT-based project had a positive effect on cross-cultural competencies.

DISCUSSION

The ever-globalizing workplace environment greatly increases the need for cross-cultural and virtual collaboration competencies across all organizational ranks, professions, and industries. Devising training programs aimed at developing cross-cultural competencies is “the biggest challenge that looms in the new millennium for human

resources managers” (Waldman, de Luque, & Wang, 2012: 14), and business schools around the world are hard at work to fill the demand. While experiential learning is believed to be an effective and necessary component of education, little research has been done on the effects of global virtual collaboration in IM education.

Our work here advances our understanding of the issue by offering the results of a multilevel evaluation of learning outcomes of X-Culture—a large-scale GVT-based project involving about 3,000 undergraduate and graduate students from 80 universities located in 40 countries in a given semester. The context of the project is closely reminiscent of that of real corporate GVTs: The supervisors (instructors) make the decision about the team assignment, the students use the same communication tools as their corporate counterparts, the expectations and performance evaluation methods vary across team members from different countries, the task is complex, the duration of the project is substantial, the teams must report their progress regularly, and the cultural differences and geographic dispersion of the participants are as real as they get. Detailed longitudinal multi-level multisource data were collected to monitor individual and team performance. When possible, control groups were used to control for the effects of factors outside the project.

As per Kirkpatrick’s (1975) model, the effects of the international collaboration projects were measured at the levels of reactions, learning (with attitudes and perceptions evaluated separately), behaviors, and results. Consistent with expectations formulated based on the experiential-learning (Kolb, 1984), social-learning (Bandura, 1977), and intergroup-contact theories (Allport, 1954), we found evidence that GVT-based projects facilitate learning: Positive effects were observed at each level of training effectiveness assessment. Specifically, the data revealed an overwhelmingly positive reaction to the GVT project from both the students and the instructors. Moreover, compared to the control groups of students who were enrolled in the same courses but did not participate in the project, students in the course sections where the GVT project was part of the course provided consistently higher course evaluations.

The participants’ cultural intelligence and their understanding of challenges associated with global virtual collaboration improved during the project. Further, students in the treatment condition (i.e., GVT Project is part of the course) tended to

perform better on the course examinations than did their counterparts in the control condition (GVT Project is not part of the course). A pre- and post-project assessment showed a significant shift in attitudes, namely a reduction in the perceived differences among different cultures. Also of interest, the perception changes occurred with respect to not only cultures represented in the team (i.e., cultures with which students interacted directly), but also with respect to cultural differences in general, which suggests that intercultural interaction has a potential to reduce stereotyping and prejudice more broadly. Likewise, the evidence suggests that the international collaboration project leads to changes in behaviors, particularly with respect to approaches to team leadership, coordination, communication, and procrastination, which are important in any team, but become paramount in GVTs that are characterized by increased complexity and an even stronger need for effective team processes. Last, and most important, the study provides evidence that the project has the potential to improve the participants' future performance.

Our findings also illustrate the value of considering multiple theoretical perspectives in evaluating and explaining the effectiveness of a particular teaching approach: While all three theoretical perspectives we used as a theoretical framework of our study suggest that GVTs are likely to produce learning relevant to IM, specific outcomes have direct relevance for each theory separately.

First, *the experiential-learning theory* predicts that the experiencing-reflecting-thinking-acting cycle (Kolb, 1984) improves context-specific knowledge, leads to more accurate expectations through a better understanding of the challenges, and develops more effective practices. The evaluation of knowledge acquisition showed that GVT experience improved participants' cultural competencies, as well as their performance on general knowledge exams in the IM courses. Furthermore, the experience led to a shift in understanding of challenges of global virtual collaboration and, more important, to change in behaviors. As a result, as expected, performance improved and students did significantly better on all performance dimensions when completing a similar global virtual collaboration task at a later time.

Second, *the social-learning theory* focuses on learning by socializing. It postulates that social interaction creates a need to adjust and work together, provides opportunities to observe and learn from others through social interactions, and

gives opportunities to test the newly acquired knowledge by trying various interaction approaches and behaviors and observing the results (Maznevski & DiStefano, 2000). Consequently, the social-learning theory predicts that social interaction, particularly with people of diverse backgrounds, facilitates knowledge acquisition, behavior adjustment, best-practice development, and thus, ultimately improved performance. As discussed above, our empirical results showed that participants in GVTs were learning through collaboration and coordination with team members. This learning experience led to improvement in knowledge and understanding, changes in behavior, and improved performance.

Finally, *the intergroup-contact theory* (e.g., Allport, 1954) focuses on interaction with "others," such as people of different cultural backgrounds. The prediction is that interaction with out-groups would lead to better understanding of their background, values, and behaviors. The reduction of the unknown, in turn, would reduce stereotyping and prejudice. Furthermore, interaction with out-groups would likely lead to discovering commonalities that will provide more opportunities for socializing and increase interest in future collaboration. The improved understanding and intergroup dynamics will likely make interaction more enjoyable and productive, thereby facilitating collaboration and performance. Our empirical findings show that, indeed, contact with representatives of other cultures not only leads to better understanding of other cultures, but also reduces perceived intergroup differences and improves cross-cultural collaboration self-efficacy. The intergroup contact experience was also reported to be enjoyable and perceived as useful, and the participants reported strong interest in future intergroup interaction. Thus, it is expected that the reduction of the unknown would, in turn, reduce stereotyping and prejudice.

Our data did not allow for testing each of the many aspects of the three theories, and some of the predicted causal relationships were not directly tested in our study. Also, given the complexity of the three theories and some overlap among them, it was not always possible to separate and isolate the effects of the factors that are components of these different theories. For example, we could not tell whether it was the experiential or social learning that led to improvements in cultural knowledge. However, overall, our findings lend support for the propositions that experience, social interac-

tion, and intergroup contact improve cross-cultural and global collaboration knowledge, change attitudes and behaviors, and ultimately, improve performance.

Also, some tests performed as part of our study did not directly relate to the three theories. Notably, the evaluation of student and instructor reactions and satisfaction were not part of the theory testing. However, given the importance of the emotional component of learning, enjoyment and perceived usefulness of training (Bandura, 1977), these were important tests of the effectiveness of experiential-learning projects, such as those that rely on global virtual collaboration, in IM education.

Implications for IM Education

The results of the study suggest that experiential projects have the potential to aid learning and should be incorporated in business school curricula. While the need for a hands-on approach has long been recognized, our study looked at the effectiveness of experiential projects in the global virtual collaboration contexts. Our findings provide empirical evidence that GVT-based projects are an effective teaching tool, and would be especially relevant in IM education and cross-cultural competence development programs. Learning projects that rely on global virtual student teams provide the much needed experiential dimension otherwise often lacking in the traditional classroom environment. Global virtual team settings not only allow students to obtain firsthand experience in the technical aspects of international and virtual collaboration, but also encourage cross-cultural interaction and information exchange, as well as provide opportunities for social and interactive learning.

Furthermore, our results show that the benefits of experiential-learning projects, particularly those relying on global virtual collaboration, go beyond improved student satisfaction and better performance on knowledge tests. Cross-cultural interactions and experience reduce perceived differences and prejudice toward different cultural groups, improve self-efficacy and perceived ability to perform tasks in collaboration with people from other countries, foster interest in future international collaboration, and ultimately lead to better performance on tasks that require cross-cultural competencies.

Instructors as well as students benefit from global collaboration projects. Instructors report that the outcomes of the GVT-based projects provided better than expected opportunities with respect to research and professional networking. Use of global collaboration projects in IM education can also help businesses reduce personnel training and development costs. Students with such practical experience entering the labor force would already have real-life experience and could use it in their jobs.

At the same time, the results of our study reveal that experiential-learning projects that involve global virtual collaboration are no panacea. While the results are very encouraging with respect to the overall effectiveness of this teaching approach, GVT-based projects have limitations. Such projects are difficult to organize and manage and are demanding of the students and instructors. They may also not work for everyone, as evidenced by the negative feedback from a limited number of students. Thus, the main implications of the study are that, on the one hand, GVT-based experiential-learning projects have great potential and should be used by IM educators as much as possible. On the other, the success of such projects depends on the way they are managed, and the approach may not be universally successful.

Limitations and Directions for Future Research

The results of our work here are generally consistent across different measures of effectiveness and in general speak in favor of including GVT-based experiential projects in IM education. However, due to a number of limitations, our findings are by no means conclusive.

First and foremost, although the context of the X-Culture Project closely resembles the actual organizational environment, we still need to determine whether the same results would be obtained in a sample of corporate employees. Furthermore, although the outcomes were positive at all levels of assessment, in the absence of a direct test, we can only speculate that the students' performance would actually be better when they complete similar tasks as employees of actual organizations upon their graduation. This is certainly an area of future research, and we hope that our findings will inspire other researchers to apply our multilevel approach to evaluating the transfer of learning from classroom GVT projects to the real-world context.

Second, while many of our tests had an experimental design with a control group, the assignment to the control and treatment conditions was not always random. Although it is unlikely that students chose their classes based on inclusion or noninclusion of the X-Culture Project (in most cases, such information was not available to students before enrolling in a class), the self-selection bias could have significantly affected our results. Further testing is needed to confirm that our findings are free from such bias.

Third, although our sample was quite large overall, with thousands of participants and hundreds of teams, some tests had to rely on rather small samples. Notably, the assessment of behaviors and performance when the students participated in the project for the second time was based on a small ($N = 41$) sample of returning participants. Due to the small sample size, these findings are questionable and they should be taken with caution.

Fourth, the platform that provided the foundation for the present study (i.e., the X-Culture Project) is unique in many respects, including the size and the scope. The generalizability of the findings obtained based on this project to other similar collaborative exercises is uncertain. Furthermore, although the sample here was very large and diverse, we did not test how the effects of the student collaboration project varied across countries, cultures, learning styles of the students, and teaching styles of the instructors. Such potential moderators are certainly worth exploring in future studies. We also encourage other IM educators who use experiential projects in their courses to evaluate the effectiveness of their programs and share the results with the academic community. An integration of findings from different studies would allow for a better understanding under which conditions global virtual collaboration (and in general, an experiential-learning approach) works and what specific features are most effective.

Finally, although the effects of X-Culture were found to be positive across a wide range of learning outcomes, the comparative value of the teaching technique was not assessed. Given the added cost of being a part of a multicountry collaborative project, both for the instructors and the students, it seems warranted that future studies evaluate whether the benefits of projects of this type outweigh the costs when compared to more traditional teaching techniques, such as lectures, in-

class exercises, and other learning and teaching approaches.

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