Research Article

Teaching Globalization, Globally: A 7-Year Case Study of South Africa-U.S. Virtual Teams

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Abstract

This article reports on a project conducted from 1999–2006 that involved a substantial collaboration between South African and U.S. universities to build human capacity for the knowledge-intensive global economy through geographically distributed collaborative learning. The project used a highly interactive, rich media, synchronous and asynchronous learning environment to foster U.S.–South Africa student team learning. Particular attention was paid to the use of commercially available Web-based collaboration technologies that work well in both developed and developing country university settings. The study had one overarching research question: Can universities in developing as well as developed countries use a suite of commercially available Web-based collaboration technologies to successfully deliver an advanced global graduate seminar? Data for the study came from narrative evaluations and post-hoc surveys of student participants. Focusing on providing a model that can be used in disparate multidisciplinary and university settings, the article highlights both the technologies and the pedagogy that recognize cultural differences and cross-national collaborative opportunities in university settings.

Introduction

Students in both developed and developing countries are challenged with mastering the skills necessary to cope with an increasingly globalized and interdependent world (Reich, 1991; Castells, 1996). Successful participation in the global knowledge-based economy requires an enhanced ability to identify, acquire, evaluate, and manage symbolic knowledge and information (Reich, 1991). Increasingly, it also requires working in geographically distributed, cross-cultural virtual teams, with team members who are in multiple time zones, countries, and cultures and who work in multiple languages (Cogburn, 2002; Cogburn & Levinson, 2003). Such teams often have differing levels of technology expertise and technology support. These teams can also be highly interdisciplinary and have transient team members who float onto and off of the team. The growing body of literature on collaboratories and cyberinfrastructure suggests that there will be an increased reliance on geographically distributed work that is mediated by information and communication technologies in diverse areas, including science, industry, global policy environments, and transnational nongovernmental organizations (Atkins et al., 2003; Cogburn, 2005).

The implications of such developments for knowledge, education, and learning are immense. While there are increasing calls in the United States for "internationalizing" the curriculum (American Council on Education,

2000), and most developing country governments recognize the need for change in their institutions of higher learning (Barrow, 1996; Varghese, 2004), most universities are not yet ready to meet these challenges. In far too many cases, the social and technical infrastructure of the university does not support cross-university collaborative learning either in terms of curricular offerings or in terms of technical support. How will universities evolve to prepare students—and faculty for that matter—for these enormous challenges (Hazemi, Hailes, & Wilbur, 1998)? The 7-year case study reported here provides one possible answer.

The purpose of this study was to explore the social and technical infrastructure required to create a geographically distributed technology-enhanced collaborative learning environment between developed and developing countries and understand how graduate students in the U.S. and South Africa responded to this type of learning environment. The study also provides a potential model for cross-national university collaboration. In the study, we explored one overarching "grand tour" question, which was operationalized by three interrelated research questions. The overarching question was: Can universities in developing and developed countries use a suite of commercially available Web-based collaboration technologies to successfully deliver an advanced global graduate seminar? To address this question, we examined the following questions:

- What socio-technical infrastructure is required to organize, deliver, administer, and evaluate a global graduate seminar across universities?
- How do participants view their experiences in a global graduate seminar with virtual cross-national teamwork?
- Does the home university's region and culture influence participation and satisfaction in the seminar?

The remainder of this article is structured as follows. First, we present a brief overview of the diverse interdisciplinary literature that shaped the theoretical foundation for this study. Second, we discuss the methodology used in the study. Third, we present and discuss the findings, highlighting implications for using in other settings the model we present and crafting future research.

Literature Review

A study such as this one is, by its nature, highly interdisciplinary. Three broad streams of literature informed our work: 1) group/team dynamics, 2) building trust in virtual teams, and 3) technology for distributed learning. In this section, we briefly explore some of the key ideas in each of these areas.

Group/Team Dynamics

One effective way to facilitate collaborative learning is to introduce teams that have been assigned to work on class-related projects. The dynamics of the teams can have a strong influence on the effectiveness of this method for student learning (Brown & Dobbie, 1999; Johnson, Suriya, Yoon, Barrett, & Le Fleur, 2002). Hence, universities and educators need to acquire a good understanding of the social and psychological factors (especially cross-cultural communication patterns) that influence team dynamics. We defined team dynamics in terms of the following three components: team performance, leadership style, and the interdependence between team members (House, Filley, & Kerr, 1971; Jago, 1982). In this study, the teams played a critical role in helping to create the learning environment for the students. Each student was assigned to a "virtual" team with no other members from their university. As a result, the global virtual teams in this study were highly diverse in terms of nationality, geographic region, technology and professional expertise, and rationale for taking the course.

Tuckman (1965) highlighted four stages of team formation: forming, storming, norming, and performing. The trust level that is developed in the first several stages of team formation is crucial later for the whole team's performance. In global virtual teams, the diversity of the teams' backgrounds, cultures, and races impacts the amount of time it takes for a team to build trust in the first three stages. In homogeneous teams, trust can be developed more quickly. Research (McKnight et al., 1998; Rocco, 1998) shows that the climate for effective cooperation is not likely to emerge without specific organizational intervention, especially leadership training activities. Leadership learning interventions before and at the beginning of the life of the team that focus on building trust become critical for the success of teams. The concept of emergent leadership is

also important to teams that are not assigned leadership (Yamaguchi, Bos, & Olson, 2002).

Building Trust in Virtual Teams

Collaboration in teams requires a significant amount of shared interaction, decision making, and responsibility for the project's success (Ingram & Parker, 2002). These collaborative activities are strongly influenced by the level of trust among team members, especially when the completion of one's own work depends on the ongoing cooperation of another person or group of people (Deutsch, 1958; Lewis & Weigert, 1985; Butler, 1991; Mayer & David, 1995; McAllister, 1995; Jones & George, 1998; Holton, 2001; Bos, Olson, Gergle, Olson, & Wright, 2002; Zheng, Veinott, Bos, Olson, & Olson, 2002). Thus, trust is a key factor for interdependent actors to work together effectively.

The initial level of trust among group members is crucial to its evolution. Trust theorists have argued that trust develops gradually over time (McKnight et al., 1998). Thus, low to medium trust at the beginning of team construction is usually present, and there is a gradual growth of trust over time. People are not likely to initially have a high level of trust toward strangers. In virtual teams, members are physically distributed in different locations across different national, cultural, racial, and economic boundaries, which further challenges initial trust levels.

To explore these issues, Rocco (1998) argued that trust broke down in electronic contexts but could be repaired by some initial face-to-face activities. Studies by Jarvenpaa and Leidner (1998) also confirm that 2-week trust-building exercises have a significant effect on team members' perceptions of the other's ability, integrity, and benevolence—these perceived characteristics contribute to the construction of trust. Both of these approaches have been integrated into this study, and specific get-acquainted and trust-building exercises were used during the first 2 weeks of the seminar.

Technology for Distributed Learning

Although it may not be the most dominant factor, the technologies used to facilitate distributed learning play significant roles in the effectiveness of the education. These technologies support cross-national collaborative learning in various ways. One of the most important conceptual divisions in technologies that support distributed learning is between *synchronous* or *asynchronous* environments. In asynchronous environments, the focus of the interaction is on different times (e.g., individuals send messages when they want to and receivers pick up and respond to the messages when they want to). Key technologies in this asynchronous space are e-mail and Learning Management Systems (LMS). E-mail is obviously used to send messages back and forth and to enhance communications among the students. LMS systems are designed to serve primarily as document repositories and as an asynchronous platform from which to build the learning community.

On the other hand, synchronous tools require the participants to communicate at the same time. Basic synchronous tools include instant messenger, chat, and presence awareness packages, in addition to audio and video conferencing and full-blown Web conferencing.

In many ways, the principal trade-off is between interactivity and flexibility—synchronous technologies provide tremendous levels of interactivity among geographically distributed participants, and asynchronous technologies allow for "anytime, anywhere" access to the material. People can choose to engage individually with the learning materials in the LMS when it is most convenient for them. The widespread availability of commercial Learning Management Systems like WebCT and Blackboard and open source alternatives like Moodle[1] and Sakai[2] probably explains why the asynchronous mode of distance education is the most dominant. In contrast, commercial Web conferencing applications are relatively expensive and have no real open source alternatives (Cogburn & Kurup, 2006). While asynchronous approaches are popular, their interactivity and support of the growth of trust and other team dynamics may be limited. However, asynchronous approaches may be useful in coping with disparate time zones, work patterns, and university cultures (Cristian, 1996; Benbunan-Fich & Hiltz, 2006; Cogburn & Levinson, 2003).

Research conducted primarily in developed countries suggests that a "blended approach," or the appropriate mixture of various synchronous and

1. See www.moodle.org
2. See www.sakaiproject.org

asynchronous technologies, is important to support the development of distributed collaborative learning (Hiltz, 1990; Steeples et al., 1996; Veerman, Andriessen, & Kanselaar, 1999). More sophisticated and media-rich CMC (computer-mediated communication) environments, such as those that include video, audio, electronic messaging, multimedia visual stimuli, and shared tools, may help to minimize any differences between CMC and face-to-face environments (Kiesler, Siegal, & McGuire, 1984). Also, students are often more willing to interact with their professors in CMC environments than in face-to-face (Kiesler et al., 1984; Welsch, 1982). However, due to the instantaneous nature of electronic communications, students may have increased expectations for immediate feedback and become frustrated and dissatisfied when that does not occur (Welsch, 1982). As such, there are seven key design considerations to keep in mind for our technology environment. The considerations include the following: 1) creation and manipulation of virtual spaces; 2) multiple forms of representation, 3) continuous but not continual communication, 4) management of the metaphor, 5) diversity of access points, 6) interactivity, and 7) socialization (McLellan, 1997; Norman, 1998; Tiffin & Rajasingham, 1995).

Gaps in the Literature

The literature does not cover in depth the following three key areas to which this project seeks to contribute: 1) empirical studies of specific virtual teams operating over an extended period of time that are composed of members from both developing and developed nations, 2) studies of specific virtual teams that focus on the interaction between cross-cultural communication and team effectiveness, and 3) longitudinal examinations of cross-national virtual teamwork at the university level. This case study provides such a long-term view of cross-national ICT-enabled virtual teams at public and private universities in developed and developing nations .

Methods

We report on a 7-year case study centering on a cross-university and cross-national project—a graduate-level globalization seminar offered from 1999–2006 at several South African and U.S. universities. Following Cresswell (2003), this study takes a QUAL?quant design, meaning the study is primarily qualitative in nature, but includes some descriptive quantitative information drawn from the surveys of participants and coded content analysis of the qualitative data. This design allows us to write detailed description analyses of our case with quantitative elements to assist with comparisons. Because of its in-depth case-study approach, this study has limited generalizability, but provides rich longitudinal insights into this specific project.

Overview of the Seminar and Participants

The seminar, which is the center of our case study, is officially titled, "Globalization and the Information Society: Information, Communication and Development" (although at each university, it has a slightly different name to reflect each program's curriculum) and is part of the curriculum at all of the six participating universities in the United States and South Africa. For example, at Syracuse University, the seminar is designed to contribute to the Web-based Information Science Education (WISE) Consortium. Students from American University are participating in the seminar as part of their international communications and international development specializations. At the University of the Witwatersrand, the seminar contributes to the Master of Management in Information and Communication Technology Policy and Regulation (MM-ICTPR) at the LINK Centre. In the past, other seminar participants have been drawn from a range of programs at the University of Fort Hare, Howard University, the University of Michigan, and the University of Pretoria. Each year, the seminar consists of 13 weekly sessions and involves an average of 35 participants registered at up to six universities (three in South Africa and three in the United States) and other participants from around the world. Most of the participants in the study were graduate students who took taking the course as part of a specific master's degree program.

Structure of the Global Virtual Teams

While some parts of the overall study have been modified over the years to allow us to explore a variety of research questions, the basic design and data collection have remained the same to allow us to compare across all 7 years on selected variables. For example, over the years, parts of the study have had a quasi-experimental design organized as a between-subject comparison on team modes (face-to-face versus distributed) and gender (male versus female). In some years, half was placed in face-to-face teams, and the other half in distributed teams. In

the last three years of the study, all participants have been in distributed teams using what we call the *CyberSeminar* model. We have published previous analyses of these various configurations of the project (Cogburn, 2002; Cogburn, Zhang, & Khothule, 2003; Cogburn & Levinson, 2004).

Data Collection

Each year, participants in the seminar are asked to take a survey and submit a written response to a 10-item narrative seminar evaluation. We have compiled a qualitative dataset from the narrative responses and analyzed them using a Computer Assisted Qualitative Data Analysis Software (QAQDAS) application called Atlas.ti. The survey results have been aggregated into one SPSS data set for the descriptive quantitative analysis. This article is based primarily on the content analysis of these narrative evaluations and is supplemented by a descriptive analysis of the survey data.

Findings

As we previously stated, the overarching research question for this study is: "Can universities in developing and developed countries use a suite of commercially available Web-based collaboration technologies to successfully deliver an advanced global graduate seminar?" To answer this question, we asked three specific research questions and explored the existing data to answer the question. These findings are presented below and are structured according to the three questions.

Socio-technical Requirements for a Distributed Collaborative Learning Environment

The first research question we ask is "What socio-technical infrastructure is required to organize, deliver, administer, and evaluate a global graduate seminar across universities?" To answer this question, we will first describe the structure of the seminar in detail. This structure gives the seminar its "social" infrastructure. Then, we will describe the suite of synchronous and asynchronous collaboration tools used to comprise the "technical" infrastructure of the seminar. We also talk about the underlying hardware and connectivity requirements for the seminar and our efforts to focus on advanced, but low-bandwidth, technology choices to ensure that the technical infrastructure was as accessible as possible to participants with varying degrees of Internet connectivity and using a variety of computing platforms.

Social Infrastructure of the Seminar

Starting in 1999, a team of researchers at six universities—three in the United States, and three in South Africa—developed an innovative learning model based on the scientific collaboratory model (Wulf, 1989). A *collaboratory* is known as a "center without walls" where researchers who are geographically distributed around the world can work together as if they are in the same physical space. This "learning collaboratory" has been used to organize, deliver, and administer an advanced synchronous graduate seminar between universities for seven years. At each university, there has been at least one individual who has served as an administrative champion for the course, translating course needs into university vocabulary and enhancing administrative support for this instructional innovation. (Today, there are more than 200 globalization seminar alumni worldwide.) Plans are underway to expand the seminar to other universities and fields, including research methods and languages.

The globalization seminar consists of 13 weekly, 3-hour sessions that run from 10:00–1:00 EST (17h00–20h00 in South Africa). Seminar participants explore the socioeconomic, political, and cultural implications of globalization and the ongoing development of a knowledge-based information society. While the seminar takes a global approach, particular emphasis is placed on the responses to these issues from the perspectives of Africa, the developing world, and especially the civil society sector. The global virtual teams are also involved directly in information policy processes such as the United Nations World Summit on the Information Society (WSIS) in several interesting ways (e.g., policy submissions, presentations, collaborative research). The seminar has the following three main components: 1) introductory activities, 2) theoretical development, and 3) analysis of core themes.

Introductory Activities

To orient the participants to the seminar and to begin the process of building trust among the participants, it begins with introductory activities. Participants relax with introductory "get-to-know you" activities with their local and global counterparts and are then trained to use all of the collabo-

ration tools and technologies used in the seminar. Based on our understanding of the literature above, we designed these introductory activities as trust-building exercises. The goal was to give the global virtual team members the highest possible chance to build trust among themselves.

Then, the substantive orientation to the issues of globalization and the information society begins, and an additional focus is placed on the importance of geographically distributed knowledge work as a response to the challenges and opportunities brought by technological innovation. We discuss the rationale for developing the globalization seminar as a globally distributed collaborative learning environment and the use of complex, distributed, cross-national learning teams. Finally, we examine the context for the collaboratory concept and explore its relevance for global policy formulation. These activities were designed to help the students understand why the course has been structured using the global virtual teams and develop strategies for effectively organizing their teams.

Students are then assigned to work within one of five cross-university global virtual teams called *global syndicates.* Each of these global syndicates represents one of the following five stakeholder perspectives in the information society: 1) global and multinational corporations, 2) developed country national governments, 3) developing country national governments, (4) intergovernmental organizations, and (5) nongovernmental organizations and civil society.

The seminar requires a total of 10 tasks, each of which involves distributed decision-making skills. To help limit the potential for "social loafing," each task has been designed to be very realistic and relevant to global information and communication policy formulation and strategic decision-making environments (Arrow et al., 2000). For example, the initial set of tasks involves collective decision making about how each syndicate will be organized and governed. Over the course of the first several sessions, the global virtual teams must do the following:

- Decide if they will represent their stakeholder grouping in the "aggregate" form or in the "individual" form (e.g., if they represent global and multinational corporations, will they represent them as a trade organization, for example, or will they choose a specific company?);
- Decide how to represent that stakeholder grouping (e.g., if they decide to take the individual approach, then which specific company will they represent, and if they take the aggregate approach, which specific organization will they represent?);
- Organize and conduct the necessary research to understand the background of the organization and engage in internal debate on its relevant goals, norms, principles, values, and enforcement mechanisms to apply to their global virtual team (what we call a "team charter");
- Develop a strategy for the organization to influence specified global information and communications policy formation processes; and finally;
- Prepare PowerPoint slides for presentation to the entire seminar that address these issues.

Theoretical Framework Development

Next, the seminar moves to develop an analytical and conceptual framework that helps guide discussions and debates throughout the semester. The theoretical framework used in the seminar is drawn from a critical formulation of international regime theory. We develop this framework through critical discussions of contrasting theoretical models for understanding globalization and the information society.

Analysis of Core Themes

The bulk of the seminar focuses on an in-depth, global political economy analysis of globalization and the hotly contested issues in the movement toward a global information society. Included in this analysis are the following seminar "core issues": 1) Digital Divide, Sustainable Development, and Social Justice; 2) Infrastructure Financing and Development; 3) Human Rights, Universal Access, and the Right to Communicate; 4) Internet Governance; 5) Privacy and Security; 6) Enabling Environment for the Information Society; 7) Open Knowledge and Intellectual Property Rights; 8) Languages and Cultural Diversity; 9) Media in the Information Society; 10) National, Regional, and Global Strategic Policy Formulation Processes.

In this portion of the seminar, the global syndicates present analyses of these policy issues, which are called "ICT Policy Projects." Since 2003, the ICT Policy Projects have involved an intense collaboration

with the participants in the WSIS. This interaction is seen as a mutual exchange—the WSIS participants serve as resources and draw on the expertise and analysis developed by the global syndicates.

The five main seminar assignments are as follows: 1) introductory presentation, 2) two group ICT Policy Projects, 3) a final group oral examination during the *Final Forum,* and 4) individual class participation.

Grades/Marks

The professor determines the students' final grades; the professor is the faculty member of record at each university. However, given the different academic structures, the grades are adjusted by a local committee in South Africa to ensure that they "mean" the same thing as they do in the United States.

Office Hours

To replicate the opportunity in a face-to-face environment for students to meet formally and informally with professors in their offices, there is a schedule of virtual office hours, both for the professor and each of the site coordinators. These official office hours are held in the virtual seminar room, and the professor logs into the room early to wait for students who would like to meet. Since the seminar starts at 10:00 EST, the virtual office hours were scheduled immediately preceding the seminar session on Tuesdays from 9:00–10:00 EST. In addition to these formal office hours, the professor makes himself available through presence awareness packages, such as AOL Instant Messenger, MSN Messenger, or Skype and also sets up specific virtual appointments outside of formal office hours.

Expectations and Academic Integrity

Since the globalization seminar is taught across multiple cultures and academic disciplines, a statement of expectations and academic integrity was prepared for the students. The statement reads as follows:

> *Statement of Expectations:* This is an advanced graduate/doctoral seminar, and as such requires a significant amount of reading, analysis and in-class discussion. While there are no stated academic prerequisites, seminar participants should be prepared for an intense interdisciplinary learning experience. The professor in this seminar has very high expectations of the participants and they should have the same of the professor. In addition to the demanding seminar sessions, the course requires a minimum of 8–10 hours of outside work per week (e.g., reading, analysis, group meetings, writing assignments).

Seminar Syllabus as Cross-Cultural Learning Contract

To foster the development of a learning community and avoid confusion among the students, the syllabus serves as an informal "learning contract" and governs all activities in the seminar. However, before finalizing the syllabus, the professor asks the students for suggestions for change. After the "final" syllabus is posted, both students and the professor are bound by the contents therein. As such, all participants are expected to complete the required reading and case assignments before attending each session; participate actively in all activities of the seminar, including the Web-based discussions in WebCT (which are also required); and participate actively in the syndicate to which they have been assigned.

Site Coordinators

Each university has an assigned site coordinator (usually an instructional staff member, advanced graduate student, or seminar alumnus–alumnae) who is physically present in the lab during each session and responsible for providing administrative and technical support. These site coordinators are accessible by e-mail or in fixed virtual hours in Web conferencing out of the session time to answer both logistical and substantive questions. Staff members are responsible for supervising and maintaining the technical system, thus minimizing the technical crashes during the semester.

Technical Infrastructure of the Seminar

As we previously described, the seminar uses a suite of commercially available, advanced Web-based collaboration tools to create a globally distributed networked learning environment. Following the design considerations raised in the literature (McLellan, 1997; Norman, 1998; Tiffin & Rajasingham, 1995), there is a highly interactive collaborative learning environment, consisting of both synchronous and asynchronous collaboration tools and including the functionality of real-time communication, e-mail, and document repositories. This learning environment includes both synchronous and asynchronous components (all tools are cross-platform, and participants may use Windows, Mac, or Linux operating systems). Each student is expected to make extensive use of the collaboration suite, which includes the following synchronous and asynchronous tools:

Synchronous Tools

Web conferencing. The primary synchronous tool used currently in our study is a commercially available Web conferencing tool called Elluminate Live! Currently, there are about 13 different Web conferencing packages available commercially. Over the years, we have evolved from using a package called Placeware (now Live Meeting) to Centra Symposium to Elluminate, primarily because it is cross-platform and has some functionality that the others lack. We chose each of these Web conferencing packages primarily because of their functionality. Each Web conferencing package allowed for the following seven key actions, which were identified in the literature as important to support the development of distributed teams: 1) creation and manipulation of virtual spaces, 2) multiple forms of representation, 3) continuous but not continual communication, 4) management of the metaphor, 5) diversity of access points, 6) interactivity, and 7) socialization.

Presence Awareness Tools: Instant messaging tools, also known as presence awareness applications, are proved to support various formal and informal communication tasks in the workplace, especially among geographically distributed workers (Nardi, Whittaker, & Bradner, 2000). Correspondingly, our study made extensive use of presence awareness packages, such as MSN Messenger, AOL Instant Messenger, and ICQ. All participants had access to the instant messaging addresses of all seminar participants, site coordinators, and the professor. Group members were encouraged to add the colleagues' MSN user names into their buddy list. This builds on the comfort college students have, both in the developing and developed worlds, with instant messaging, text messaging, and other social networking sites such as MySpace and Facebook (Stutzman, 2005; Govani & Pashley, n.d.).

Asynchronous Tools

In addition to these synchronous tools, we also use asynchronous content management software (CMS). We started the seminar in 1999 using UM.Worktools (now known as Ctools[3]), as an asynchronous shared workspace and e-mail mailing list software that has evolved into the open source CHEF project. Now we use the commercially available WebCT learning management system. Both are Web-based file repositories, which allow participants to access the course syllabus, files, e-mail archives, and readings. Further, each team (both face-to-face and distributed) had their own site, which included an e-mail list, and team members were able to use it as they desired. Team members have equal access ability to the Web site, whether or not they are physically at the host university. They can upload project-related materials to the team WebCT/Worktools site as needed and can also download documents from it. WebCT/Worktools provides a way of sharing and exchanging digital documents without heavily relying on e-mail attachments. In addition, it supports a much more systematic method to archive and organize these materials.

Hardware Requirements

A computer lab is available on each campus, which students are welcome to use to participate in the seminar. Each lab has a technical support person to work with the site coordinator to ensure the best possible information infrastructure for the seminar. However, in the spirit of the *cyberseminar* model on which the seminar is based, participants are welcome to connect to the seminar from anywhere they have access to a stable connection to the Internet (minimum 28.8 kbps) using Windows, Mac, or Linux machines. If students choose to connect from outside of campus, they are responsible for their own technical support (including headsets, speakers, and microphones) and must accept the consequences of not being in the campus computer lab.

The professor leads the seminar from within the virtual seminar room and engages the participants through an interactive initial lecture using a range of multimedia techniques (e.g., slides, graphic images, movies, interactive Web sites, and other instructional tools). Polls engage the students in debates and gauge their feelings about the pace of the lecture (e.g., too fast, too slow). Participants listen to the professor's audio and view the professor's video on their computer screens, regardless of the location from which the professor is broadcasting (e.g., Syracuse, New York; Washington, D.C.; Johannesburg, South Africa; Geneva, Switzerland). Seminar participants also are able to raise their hands; ask verbal

3. See https://ctools.umich.edu/portal

and written questions; indicate laughter and applause; and speak to the entire seminar, their global syndicate members, or both. They also have the same access as their professor to the white boards, slide mark-up tools, applications sharing, and other collaborative features.

In addition to using the seminar's collaboration infrastructure, we also used this infrastructure for all aspects of administering the seminar, from developing the content and organizing and delivering the seminar lectures and discussion sessions to assigning final grades/marks. Over the course of the 7 years, the entire administrative/research team never met face-to-face, nor have the members even been on each other's campuses. Only the professor has met physically with all members of the administrative and research teams. So the infrastructure described above, though an expensive initial investment, has been sufficient to conduct the seminar and now will be sufficient to expand into other universities, countries, and subject matter.

The cost, of course, possesses important implications for developing nations. While Free/Libre and Open Source Software (FLOSS) alternatives exist for the asynchronous content management needs of the seminar, no such FLOSS alternatives are available for the commercial Web conferencing packages used in the seminar. Such a FLOSS alternative would be a welcome development if it possessed the key functionality required by the seminar and was as user friendly as the commercial packages.

Interestingly, we have found that although video is an important component initially, especially to some of the students participating in the seminar, it adds little to a professor's ability to deliver instructional content.

Exploring the Participant Experience

Our second research question asks "How do participants view their experiences in a global graduate seminar with virtual cross-national teamwork?" We explore various dimensions of this question, and the findings here are quite encouraging.

During the 7 years, when asked on a 5-point scale if they would "register for this course or another one like it," most of the students (n = 130) (73%) said they liked the course and would register for this course with "this professor" or "any other." Further, most students (65%) said they would "recommend it to a friend, as is." There is, however, a gender effect: more men (83%) were willing to register again, and only (57%) of women were willing to register again. Also, the global virtual team model seems to have worked well—the global syndicates became a learning community for most of the respondents (81%). Nearly all of the participants (97%) saw the global syndicate approach as valuable to their learning experiences, and many (51%) asserted that the approach was of tremendous value.

Face-to-Face Versus Distributed Teams

We have expanded this analysis to try to understand the impact that "group mode" (e.g., being in a face-to-face team as opposed to a geographically distributed team) has on students. In this expanded analysis, we explored two loosely formulated hypotheses. The first hypothesis was that students working in face-to-face teams would develop higher levels of satisfaction than students working in a global virtual team. By coding and analyzing the narrative responses to the questions "What did you like most and least about the seminar?" and "How did you feel about the course lectures?" using a 5-point scale, we found a high level of overall satisfaction (95%) and no statistical relationship between group mode and satisfaction.

Our second hypothesis about group mode is that students working in face-to-face teams are more likely to perceive that their groups are "learning communities." Here, we do find an effect for group mode. While most students during this phase of the study saw their team as a learning community (68%), students in face-to-face teams valued their teams slightly more (75%) than did students in global virtual teams (63%).

However, when exploring the qualitative data, we found the following interesting examples of how some students valued the global virtual teams:

- "The [global] syndicate contributed to a large degree [of my learning]. As explained before, one of the unique values of this course was to put people together from different backgrounds."
- "Brainstorming with my group members definitely contributed to the overall learning experiences [in the seminar] because of the different backgrounds we come from."
- "I think the seminar provided an excellent hands-on interactive experience and boosted

my confidence in using various IT innovations to improve quality of work; I am very impressed by the way that technology can help you to study from any part of the world."

On average, students reported that their overall satisfaction with the seminar was 3.7 (on a scale of 1 to 5), which indicates a relatively high satisfaction level. As for satisfaction measured in the perception of the team as a learning community, most students (75%), from both face-to-face and distributed teams, agreed that their team members contributed to the teamwork and they benefitted from discussing the course with their team members. One female participant from the United States working in a face-to-face team reported that "discussion and collaborative work with syndicate group members were great opportunities for me to consider the global issues. . . . I learned from them a lot. . . ."

Although the distributed team members disagreed on the overall contributions of other members, they acknowledged that distributed teams had two major advantages over face-to-face teams. One benefit, according to some, was the excellent opportunity to learn how to communicate with teammates that were in different geographic locations and time zones. For example, one female from South Africa participating in a distributed team noted that "I learned about the complexities of working in a team, across time zones, and with different levels of technical competence . . . I learned about the advantages of technology in work, and I learned about its disadvantages . . . seeing photos of each other helps put a face to a name, personalizing the other member of the team."

Another U.S. female face-to-face team member expressed a similar idea: "It would have been nice to have video photographs of team members in other countries because sometimes, I felt like I was working with 'virtual people' [on the other teams]."

Technical Proficiency

Generally speaking, participants found the distributed nature of the seminar acceptable. One U.S. female student indicated that "I got a bit nervous about using technology to communicate with others and work on group projects. Now I feel much more confident in using the technology and actually don't see much of a difference in communicating with other in person or via IT. "

Another student wrote that she was a bit afraid that the technology used in this course would be too sophisticated, but that her fear was assuaged as the seminar progressed over time.

Faculty Presence

Another dimension of participant experience explored in the study is the student perception of the impact of faculty presence or absence. Specifically, we were trying to understand how the students responded to the seminar when the faculty member was not physically present (but leading the seminar from another location). Here, we hypothesized that the physical presence of the faculty member will have a small but measurable effect on satisfaction.

We found that, indeed, there is a small preference for the physical presence of the faculty member. Slightly more than half (55%) of all participants prefer the physical presence of the professor. One student observed: "I benefit enormously from the nuances of live interaction and feel that face-to-face communication invites dialogue . . ."

However, in contrast, many students (45%) did not perceive that there was any major difference in the seminar whether or not the professor was physically present. As one student suggested, "I actually believe that the professor's physical presence made no difference in terms of the lecture or the session. I never felt that the professor's physical absence had any sort of negative impact on the lecture." Finally, several students (10%) actually reported that they preferred when the faculty member participated remotely.

The answer, then, to this second research question is a strong "Yes!" In summary, a graduate-level cross-national virtual team learning experience is feasible between and among universities in developing and developed countries; and appropriate ICTs make it possible.

Exploring Regional Impact on Participation

The third, more limited, research question explored whether or not geographic region mattered: "What is the impact of region on participation and satisfaction in the seminar?" Here, we looked for significant differences between the experiences of the developing and developed country participants. We asked a basic question: "Do participants from South Africa have higher levels of satisfaction than their U.S. counterparts, and will they find greater value in their syndicates as learning communities?" This question

was based on an assumption that it was likely that more opportunities for innovative high-tech learning experiences would be available to U.S. students, and thus South African students would value this particular experience more than their U.S. counterparts.

Overall, the quantitative data suggested that there were limited regional differences, and the qualitative data provided less support for this assertion. For example, we found that looking at the aggregate data, all (100%) of the South African participants would recommend the seminar to a friend "as is" compared with only 70% from the U.S. Also, very few South African participants (17%) believed that their syndicate members "did not contribute much to their understanding" compared with most U.S. participants (32%) who felt this way.

Discussion and Implicatons

It is possible, though challenging, to successfully deliver a highly complex, advanced, interdisciplinary graduate seminar on campuses in more than one country. Geographically distributed collaborative learning allows students to "speak for themselves" by going global, locally—meaning, to participate in these global discussions while sitting comfortably in their own countries at their own universities.

The findings discussed here are also important for research and scientific knowledge creation. What we have learned has shown that it is possible to include developing country participants in advanced Web conferencing and tightly coupled collaboration activities. We have already started to explore these ideas in building globally distributed research communities.

There are some provisos. In this study, it is important to note that the participants were self-selected: Those who were willing to attend the seminar after learning about its high technological intensity were at least comfortable with the online learning model. It is reasonable to assume that they might be more technologically competent than other students in their universities, and thus they might not represent the general population. However, in several cases, students registered without knowing first that the seminar was taught in a distance education manner and did not drop the course. This result suggests that once the student overcomes the initial fear of technology and actively participates in the seminar, he or she either will not feel a significant difference from participating in a traditional class, will perceive the benefits of the seminar's distance learning components, or both.

Another finding is that even if there is a very low level of effective leadership and trust on a given team, some virtual learning teams can still sustain and achieve a certain level of success, as long as their members stick together and contribute sufficiently. In some teams, members do not view any one of them as the leader. At the same time, these team members do not develop a satisfactory level of trust. Each student develops his or her own working strategy and finishes the task individually. However, the student still recognizes the importance of the interdependence of the team, because the final achievement is assessed at the team level. He or she will try to make the work consistent with the work of the other team members. In the end, the team puts all of the components together as a whole. In a team without leadership and trust, the concept of interdependence between team members can best be described as a facilitating factor for the team's working strategies and members' behavior. Thus, to promote strong interdependence, the professor needs to ensure that clear task requirements and reward systems are present. Interdependence among team members can foster individual team members working together even if there is no effective leadership or satisfactory trust level within the team.

A key finding related to interdependence is the importance of cross-cultural awareness and the fostering of cross-cultural communication skills. The role of sensitivity to one's context and teammates is clear from this case study. Thus, similar pedagogical approaches at the university level, no matter the subject matter, should consider the development of cross-cultural awareness and cross-cultural communication skills as a part of their curricular design. Such work goes beyond traditional college approaches to designing classes and curricula in both developed and developing nations. The presence of champions on individual campuses who can marshal both the technical resources and curricular design resources—including the recognition of the roles of cultural context on cross-national, virtual learning, and collaboration—is key, based on our findings.

Additionally, these findings possess important implications for universities wishing to be involved with ICTs for development. The learning that occurs in

geographically distributed collaborative learning settings is valuable in many ways. Actually using ICTs to craft learning that involves more than one culture and organizational setting amplifies experiential learning about ICTs themselves—their advantages and disadvantages in specific contexts and their utility for enhancing development. Our ability to highlight the role of trust was the most important, including among the informal team composed of cross-national university administrators and staff. As noted above, this study indicates that a champion for collaborative cross-national learning—one who is trusted by each participating university and who understands the cultural contexts of the participating institutions—is essential. And in our study there is a related element: the legitimacy of the champion. As we noted previously, the participating universities reviewed and approved the professor's academic appointment to their own faculties. Additionally, there needs to be a "technology champion" or an equivalent at each participating university.

Naturally, there are numerous constraints to generalizing from this study. It may be that it is rare to find a faculty champion who can be trusted in multiple institutions with multiple cultural contexts. This work, however, because of its longevity, the different universities involved over time (for example, first University of Michigan, a major state university in the middle of the United States and later Syracuse University, a private university in central New York), and even the different curricular settings across universities, can inform learning about ICTs for development. ICTs can foster cross-national collaborative learning among universities, both urban and rural. Finally, we highlight one way that universities in different countries and in different settings can actually use ICTs for development: They can collaborate across borders and cultures, forging trust and offering opportunities for learning in virtual cross-national teams. Such settings and such learning, as documented here, provide the knowledge and skills requisite for our increasingly interconnected and information intensive world.

Future Research

This study stimulates much future research, for both our research collaboratory and others. We plan to continue the data analysis, blending the qualitative and quantitative data. This more comprehensive database should yield some very interesting results. We also want to compare the findings of this study with other sectors and examples of global virtual teams. For example, we would like to compare the results with results from studies of global product design and business ethics teams. Moreover, we want to encourage the technical development of FLOSS Web-conferencing tools, because at the moment, only individuals that have the financial resources to afford the key technologies described herein can apply the findings of this study. We urge research into making these collaboratory applications more accessible to people with various kinds of abilities, including those with physical and mental disabilities. We have had one interesting, albeit limited, experience with incorporating a deaf student into the globalization seminar. The participation of a deaf student has major implications for many parts of our world. Finally, we would like to continue to expand our participants, adding more universities and countries, different faculty members, and different subject matter. There is much opportunity for formal and informal collaboration with faculty and administrators from around the world for a more in-depth assessment of such efforts. ■

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