International Review of Research in Open and Distance Learning
Volume 10, Number 1. *ISSN: 1492-3831*

February – 2009

Integrated Networks: National and International Online Experiences

Osvaldo Muniz-Solari and **Christine Coats**
Texas State University, USA

Abstract

There is an increasing impression among online geography educators that interaction can be developed based on specific teaching and learning methods. The authors developed a practical research study to investigate this issue. The study was based on advanced graduate courses in geography at Beijing Normal University and Texas State University. International interaction was complemented by online collaboration among the US local group. Both synchronous and asynchronous communication systems were used, which spanned two platforms. Results of this experience indicate that teaching and learning methods must be enhanced by a flexible online learning model and extensive organizational support in order to increase interaction and reach a certain level of cooperation.

Introduction

The effective use of instructional technology requires not only training (Solem, 2001) but also organizational decision-making that supports adopting new Internet teaching technologies (Rogers, 1995; Taylor & Swannell, 2001). Today, opportunities abound to develop new instructional technologies for a large variety of courses, prepared mainly for undergraduate studies. Within the field of geography, and particularly within the realm of geography education, both instructors and students face many challenges when dealing with intensive and extensive contacts in cyberspace. Training for teaching and learning must include organizational support related to increasing the level of online interaction, cooperation, and collaboration. In this paper, we analyze and discuss the level of integration of a flexible online learning model through a specific dual example in higher education. A systematically integrated network of American and Chinese graduate students was tested to verify the level of interaction.

Online Geography Education

Social Construction of Knowledge

The emergence and development of global higher education through what was generally called distance education can be sequentially organized in four generation models to explain the process of cybernetic interaction: the correspondence model, the multimedia model, the telelearning model, and the flexible learning model (Taylor & Swannell, 2001). Within the context of the most up-to-date online education, the flexible learning model has to be understood as systematically integrated and institutionally comprehensive (Taylor & Swannell, 2001).

Interaction is a continuous and dynamic process. It is not a simple process of communication, either through synchronous or asynchronous modes of operation among several individuals, but an increasingly flexible way of acquiring and transmitting knowledge within a group of people who are engaged by a common interest. The term flexibility guides us towards actual models of pedagogical thinking, such as self-organized learning and multi-perspective approaches (Albrecht & Tillmann, 2004).

Knowledge distribution, within the context of online interaction, means reflexive learning in a constructivist sense, and a construction of geographical knowledge entails interactivity. Albrecht and Tillmann (2004) point out that the learning process involves interactivity, either with different structured learning modules or in collaboration via communication tools. They add that the first form of interactivity enables an individual construction of knowledge while the second form makes socially embedded knowledge construction possible (Albrecht & Tillmann, 2004). However, we think that the process is more complex since interaction always starts with two people as a simple form of learning. The next step is not collaboration but a possible cooperation, in which more than two people interact as a group. This stage is too early to reach socially embedded knowledge construction, but it is necessary that a group engaged in a discussion forum or an asynchronous type of communication demonstrates a certain degree of mutual confidence. The social construction of knowledge requires an expression of confidence and trust in which leadership is offered by one member at a given time. Further, the social construction of knowledge requires that most of the members play the role of a leader in one way or another, according to the problem to be resolved. Once the group reaches this stage, it could be called a team, working at the level of collaboration. Therefore, knowledge construction within the context of online interaction supports two superior stages of progressive development: e-learning by cooperation and e-learning by collaboration. The first is associated with a group and the second is characterized by teamwork (Figure 1). The most common process is the transition stage between interaction and cooperation. Normally, this process requires an increasing level of technological development to respond to the increased number of contacts and the need for efficient interaction. The following figure has been adapted from Albretcht and Tillmann (2004) to explain graphically the reorganization process of knowledge construction and the difference between cooperation and collaboration.

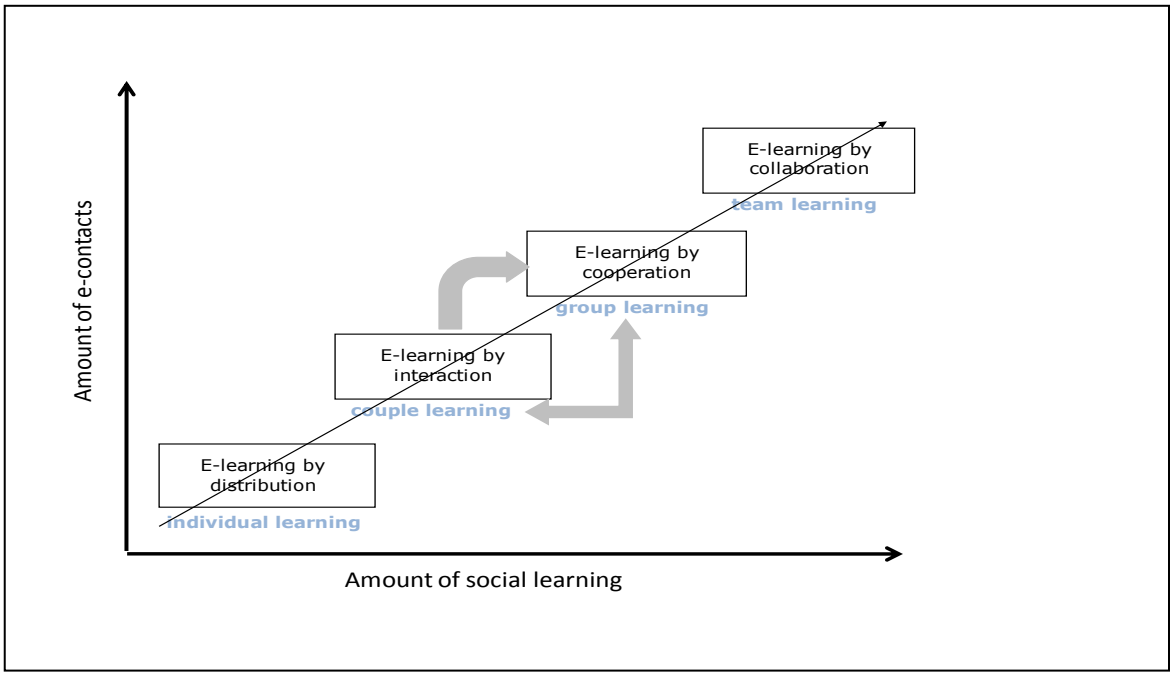

Figure 1. Knowledge construction by increasing social learning. Adapted from Albrecht and Tillmann (2004).

E-Learning

The emergence of e-learning in geography education presents both challenges and opportunities for instructors. In order to fully embrace the use of technology, instructors must learn a new language, the language of e-learning, where many terms are foreign to them. One challenge is the acronyms that the instructor must learn in order to successfully use Web-based technology for course delivery. These acronyms often refer to the same basic set of tools for course delivery and the management of learning content online. Essentially, students and teachers are brought together through a set of computer-based and computer-supported education and training systems accessed via Internet-connected computers. This defines e-learning, the contemporary version of distance education (Pollalis & Mavrommatis, 2008). The set of Internet-connected computers and the software required for course delivery may be referred to as LCMS (learning content management system) (Pollalis & Mavrommatis, 2008), LMS (learning management system) (Monahan, McArdle, & Bertolotto, 2007), CMS (course management system) (Blackboard, 2008), or TLE (teaching and learning environment) (Pahl, 2003).

Regardless of the terminology used, there is far more to the deployment of an e-learning system than simply the selection of the course delivery system. A system framework, an e-learning "ecosystem," must be developed that specifies the learning system architecture for pedagogical development and systems integration. The framework must be flexible enough to change and evolve as needs arise (Ismail, 2001). As well, the e-learning system must allow flexible, learner-centered education (Lee & Lee, 2008).

In the development of an e-learning system, two options are available: closed or open source systems. A closed source system is a commercially available system where the source code (programming) is not available. Closed source systems are self-contained, pre-packaged systems that cannot be modified by the consumer. Some examples of commercially available systems are Blackboard (Blackboard, 2008), WebCT (Blackboard, 2008), and TopClass (TopClass, 2008). Systems with freely available source code are called open source systems (Open Source, 2008). Open source systems provide an alternative to the higher cost proprietary commercial online learning solutions and are distributed free of charge under open source licensing (Romero, Ventura, & Garcia, 2007). One advantage of an open source system is that it enables an organization to fully access the source code, make changes, and add improvements and features continually. Some examples of open source or free systems are .LRN (.LRN, 2008), Sakai (Sakai, 2008), Moodle (Moodle, 2008), Ilias (Ilias, 2008), Eledge (Eledge, 2008), and Claroline (Claroline, 2008).

Each open source system offers flexibility and infrastructure, which can be modified based on organizational needs and instructional design. For example, Moodle (Moodle, 2008) is designed to support social constructivist pedagogy (Rice, 2006). Sakai (Sakai, 2008) is an online collaboration and learning environment, which has been deployed to support teaching and learning, collaboration, and research collaboration at Texas State University – San Marcos. The Teaching, Research, and Collaboration System (TRACS) is the new Texas State University open source collaborative learning environment, and it is based on Sakai. TRACS consists of course and project sites. A course site is used to present documents and materials for a course, and a project site is used for research collaboration. (Texas State University [TRACS], 2008).

In addition to formal e-learning or learning management systems, auxiliary technology that operates outside of the formal system can be used by instructors and students during the e-learning process. Internet communication technologies, such as Skype (Skype, 2008), email, and social Web sites for communication and data sharing, as well as traditional telephone communication, all contribute to successful e-learning experiences.

Both closed and open source systems offer similar access to common Internet communication tools, such as e-mail, chat, and discussion boards. However, a limitation of these communication tools is that they are mostly asynchronous. A need exists to incorporate real-time synchronous technologies for text, visual, and audio communication (Monahan et al., 2007). The incorporation of synchronous technologies can enhance a student's sense of belonging to a supportive learning community (McInnerney & Roberts, 2004).

In the United States, it is generally assumed that students have full access and freedom to use computers both at the university and at home, although knowledge about communication platforms and tools is not widespread. The availability of technology as well as the quality and quantity of computers in Chinese universities, schools, public institutions, and households is not as developed as in the United States. The use of computers and communication systems can be restricted by government regulations. Even in e-learning operations in which interaction and cooperation could take place, there are restrictions to freedom and equality in the process of

individual and mutual knowledge construction. Restrictions due to the social, political, and technological climate of a country cannot be ignored. Strict control over the use of the Internet is a barrier to developing online education. Some countries, as in the case of China, fear a number of social security problems (Lo Choi, 2001). Also, restrictions can include limited access as well as imperfect monitoring. Consequently, the state where the e-learning is conducted, according to Brunn (2003), remains important.

Inquiry-Based Learning

Our study involves an Inquiry-based Learning (IBL) process, in which two different groups of participants are engaged in interaction and seek appropriate resolutions to questions and issues. The setting can be characterized as an "open room," which is based on two different online platforms. The members of both groups have never had experience with this type of environment. In Figure 2 (below), Case 3 shows the most common learning environment encountered by participants who are acting as self-directed learners and who have the opportunity to be differentiated among their peers by their individualized way of learning.

Even when it is acceptable to recognize these four environments as typical classroom settings, it is also possible that Case 3 could be initially developed for an online learning process. Cases 1 and 2 are based on a receptive and non-active type of environment, which is unsuitable for distance education. A typical Case 3 environment might take place through a process of Inquiry-based Learning (IBL), and cooperation might be possible. Case 4 is the most advanced environment for active learning. It is characterized by a group of participants who play the roles of dynamic actors. Interaction flows from Problem-based Learning (PBL) techniques, which require students to solve problems collaboratively.

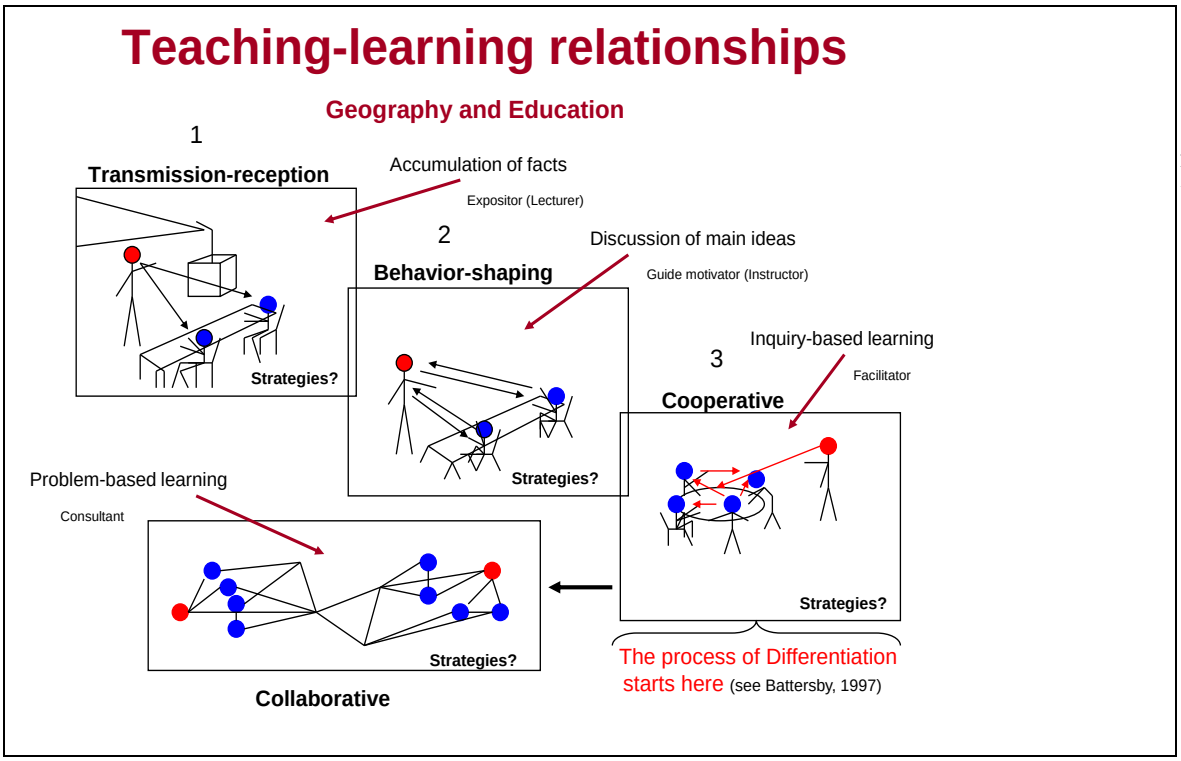

Figure 2. Case 3 as the most common typical environment of the study.

Method

The online experience was constructed as a part of a graduate course in Geography Education in the Department of Geography at Texas State University. It was based on learning modules developed between 2003 and 2006 by the Online Center for Global Geography Education (CGGE) project, funded by the National Science Foundation. The modules are available through the Association of American Geographers' Web site to instructors and undergraduate students at universities and colleges for use in formal geography courses (Association of American Geographers [AAG], 2008). Among the three available modules created by the CGGE project, the module on Population was chosen. This module had been tested several times by undergraduate students in formal courses developed and coordinated between U.S. and foreign higher education institutions during numerous trials between 2005 and 2006 (Klein & Solem, 2008). For the purpose of this teaching and learning experience, the Population module was tested with graduate students.

Fourteen students from two academic institutions, Beijing Normal University and Texas State University – San Marcos, participated in the advanced geography graduate course. The Chinese students consisted of seven graduate students at the master's or PhD level. For the American students, the local group was composed of seven PhD students from Maryland, Kentucky, Texas, and California, who communicated exclusively in the online environment.

Students participating in the class were assumed to have basic technology skills, such as Microsoft Word, Excel, PowerPoint, and Internet navigation, before the process of online interaction could take place. However, students in the United States had to learn to navigate both the TRACS and Blackboard platforms in order to create a reasonable and steady interaction process. Prior to initial contact, the Chinese and American students developed personal Web pages as a source for introductions. The Web pages allowed the students to develop personal identity and social presence in the online environment.

The overall U.S.-China experience was set in three stages. The first stage was developed by each local group to interact and discuss some issues related to online interactions for a month before engaging themselves in the international experience. One faculty member from each university served as the local coordinator and facilitator during the student interactions. For the U.S. group, the facilitator interacted with students in TRACS and instilled confidence in the process by providing selected readings about online teaching and learning. The TRACS discussion forum was used for asynchronous interaction, and the chat room allowed the local group to develop synchronous communication. In contrast, the Chinese counterpart worked with a facilitator at the local level by using only a face-to-face traditional classroom environment.

The second stage was initiated when members of the local groups were randomly assigned to international teams by the instructors. Four mixed teams learned how to use the *Blackboard* platform and to develop personal Web pages prior to their work with the first two lessons of the Population Module (Phase 1). For the final two lessons (Phase 2), two new mixed teams were assigned. All teams utilized the Blackboard platform for their exercises. The students interacted through established discussion forums, which were set up based on questions from the lessons.
The third stage was developed by the U.S. local group once the international experience was over. This stage focused on revisions of the instructional design, learning process, curriculum structure and platform operations, and IBL-PBL propositions (Figure 3).

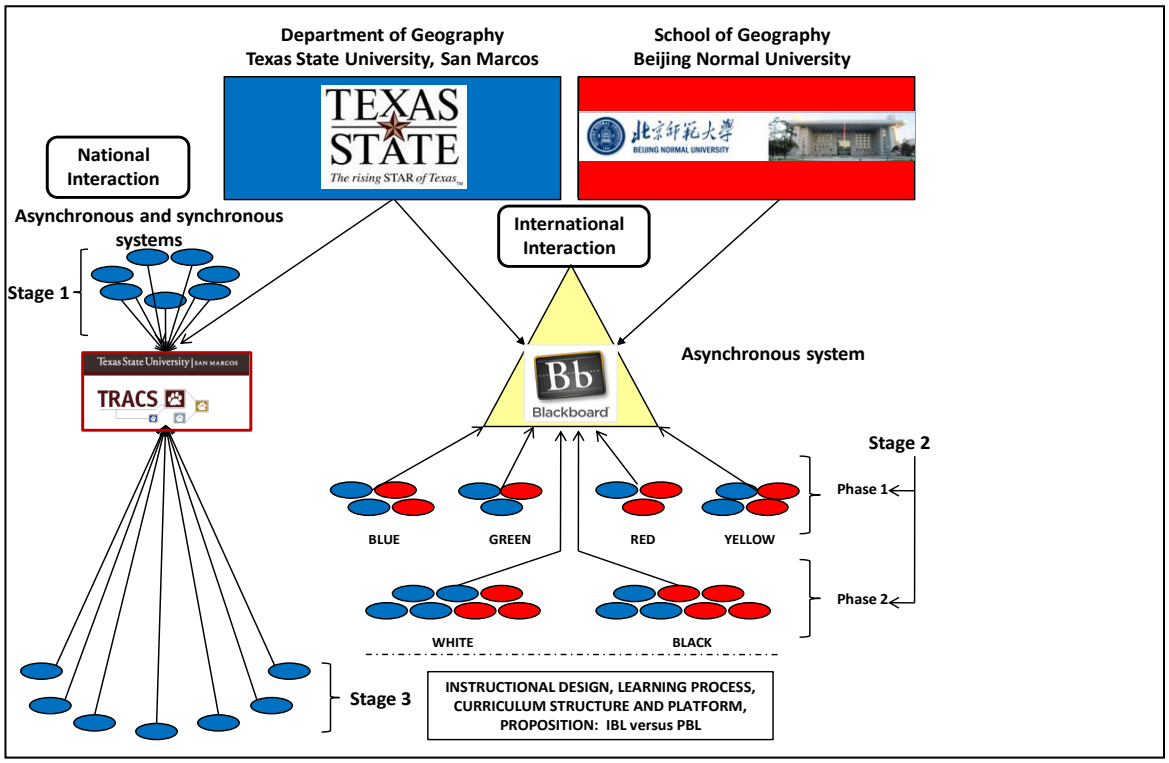

Figure 3. The setting of the online national and international structure.

The method employed to analyze the process of learning during the three stages was both direct and indirect observation. Direct observation was conducted by the Chinese instructor during the face-to-face traditional class in the School of Geography at Beijing Normal University before the international experience was developed (first stage). In contrast, indirect observation was performed with the U.S. group during all stages. Likewise, during the second stage, that of the international interaction , Chinese students were observed indirectly. A particular method of observation was selected for this purpose, which followed complete observer and unobtrusive observer procedures (Gold, 1958; Gorman and Clayton, 2005). For the purpose of this research, the "passive" role as described by Spradley (1980) was adopted as an indirect approach for systematic readings of discussion forums and chats. As observers, the instructors did not participate or interact to any great extent with the students when they were engaged in online discussions and interactions.

Three observations were performed during the national and international online experiences:

1. *The level of network operation for the local group (i.e., national) and international mixed groups*. The most critical procedure was to verify whether or not the two platforms (i.e., TRACS and *Blackboard*) were used efficiently.
2. *The conditions of group activities at the national and international level*. The most critical procedure was to observe the social construction of knowledge within the context of online interaction.

3. *The characteristics of the learning process to resolve problems*. The most critical procedure was the level of resolution achieved by the students who were focused on inquiry-based learning and problem solving strategies.

Overall, observation focused on the flexible learning model to verify to what extent the students gained experience and mastered learning procedures in the two digital platforms and using several integrated telecommunication technologies.

Results: The National and International Interaction

The local group represented the interaction on the national level. The national interaction was different between the Chinese and American student groups. The American students, utilizing two platforms, were playing a dual role during the exercises: regular students going through the lessons, exercises, discussion forum, and tests, and instructors, observing the whole process in order to offer suggestions on how to improve the module and the learning method. During the three stages of the national and international interaction, the TRACS platform was used for course development, and Blackboard was used for the international practice and access to the CGGE Module (Table 1). Blackboard was the only platform accessible to the Chinese students for their international activities. A Blackboard tutorial was provided as an initial assignment in the class for both international groups.

Table 1

Three Stages of the Online Interaction Program

MONTH	TOPIC	SETTING	ACTIVITY
1st Stage 1	1. E-learning Pedagogy 2. Platforms (technical issues)	Virtual Classroom (*) National Interaction (**)	Chat-Room TRACS
2nd Stage 2	Population Module PHASE 1: Lesson 1and 2	International Mixed Groups Blue, Green, Yellow, Red	Discussion Forum *Blackboard*
3rd	Population Module PHASE 2 : Lesson 3 and 4	International Mixed Groups Black and White	Discussion Forum *Blackboard*
4th Stage 3	Evaluation 1: Instructional Design	Virtual Classroom (*) National Interaction (**)	Chat-Room and Discussion Forum TRACS
4th	Evaluation 1: Learning Process	Virtual Classroom (*) National Interaction (**)	Chat-Room and Discussion Forum TRACS
4th	Evaluation 2: Curriculum Structure and Platforms	Virtual Classroom (*) National Interaction (**)	Chat-Room and Discussion Forum TRACS
4th	Evaluation 3: Inquiry-based Learning and	Virtual Classroom (*) National Interaction (**)	Chat-Room and Discussion Forum

	Problem-based Learning		TRACS

Note: * Virtual Classrooms were developed by PhD participants as part of the national group attending the seminar in geography education from different locations in several states (California, Kentucky, Maryland, and Texas). **National Interaction was performed individually.

Though largely successful, the local group interactions exhibited a few negative characteristics. Whereas some students tended to dominate the forum, getting in early with multiple postings, other students participated infrequently or not at all. Some students were confused about which platform to begin on or where to download the initial lesson in order to start the process. Also, during the activities, students used the technology most familiar to them. For example, some students used email to communicate instead of TRACS.

Students naturally formed sub-groups with previous acquaintances. There was a noticeable tendency to bounce ideas off of one another before participating in the official TRACS forum. Students expressed concern that they could not preview their responses prior to posting; also, they were concerned about whether or not their responses were appropriate or "academic" enough. The use of such outside interactions may strengthen ties between some group members but unintentionally alienate others.

In preparation for the international interaction, lessons were downloaded from the CGGE Module in Blackboard. In the American local group, students provided support and feedback to one another as the group worked through the lessons using TRACS prior to the international interaction. Once the local group discussion was over, members of the local group split into the international teams and worked through the lessons in Blackboard. After initial hesitations, students felt more relaxed working together and they became partners in the learning process.

The conflicting schedules of Texas State University and Beijing Normal University hindered interaction between the students. Semester start dates, national holidays, and semester breaks all contributed to uneven participation in the discussion forums. The time difference between China and the United States as well as the time differences among the American national group students hindered synchronous communication. There was a significant lag time in the posting of responses, which caused frustration. The Chinese local group met in the classroom, however it was not known if this was their designated online communication time.

At the national level, some of the American students had attended face-to face classes together in the past, whereas others had no prior knowledge of one another. Outside emails were used by some students in both the national and international interactions as an additional, less formal means of introduction. Initially, it was apparent from the communications and Web sites of both student groups that there was a sense of excitement and an eagerness to communicate with one another. Overall, the students developed a working relationship (Example 1). Some students used the Internet to conduct additional research beyond the requirements of the class. The students actively shared their research with their national and international colleagues through the posting of Web site links or PDF documents.

Example 1:TRACS. Local group members participating and referencing one another's responses in a constructive way

AS 5 (Nov 1, 2007 10:05 PM CDT) I agree with AS 7 and AS 1 concerning the need to cooperate among these three countries to conserve water as well as conduct land and water resource management. I am also going to post my personal opinion based upon some Internet research that I did regarding this ongoing conflict. There has been several research studies conducted on this issue. One is listed in the Middle East Policy Journal that I have been tried to retrieve.

AS 6 (Nov 1, 2007 11:14 PM CDT) AS 5, the research you unearthed regarding the historical water agreements among these nations is a crucial piece of material as it is 100% clear that this isn't a simple problem you can throw a little bit of money at and make it go away. A comprehensive land use/ water resource management study is a solid recommendation. i bet if we looked into the research further, we'd find that many have been conducted. i think the conflict has persisted for thousands of years, no?? :) in any case, thanks for your terrific leadership.

The international experience was not developed to be a competition between teams, but rather was intended to foster a dialogue and to provide a bridge for the students to communicate and discuss relevant issues. Examples 2 and 3 are typical cases of the initial and advanced international interactions, respectively:

Example 2: Blackboard. International initial interaction

Current Forum: Lesson 1: Bolivia
Date: Mon Sep 24 2007 9:03 am
Author: CS 3 (Blue Team)
Subject: Hi~I am CS 3. I am a chinese girl and glad to communicate with you. China is a country which has
the largest population in the world so i have a lot of thing to discuss with you. I hope that we can discuss it
actively in the future.

Current Forum: Lesson 1: Bolivia
Date: Mon Sep 24 2007 10:16 am
Author: AS 1 (Blue Team)
Subject: Re: Hi~I am CS 3.
Hello, it is very nice to meet you. My name is AS 1 and I look forward to working with you.

Example 3: Blackboard. International advanced interaction

Current Forum: Lesson 2: Demographic Transition Model
Date: Mon Oct 1 2007 8:38 am
Author: CS 6 (Red Team)
As far as I am concerned, a country's population change may attributes to many factors, and economic development is one of the main. For example, in China, as the country's economic develops more and more young couples want to achieve their own goals, then child may became their burden. So they don't want to have more children, one is enough (this act also welcome by the government),even some couples don't want to have any children. In a word, one country's economic development can stabilize its population. But there are also some other factors, as country's population policy, traditional culture, living conditions, etc.. What do you think?

Current Forum: Lesson 2: Demographic Transition Model
Date: Sun Oct 7 2007 12:03 am
Author: CS 8 (Red Team)
CS 6- Hi. sorry for the delay. As I said, I've had spotty internet in rural midwest America (I had to leave California for a week), plus, we were informed you were on vacation this week in China.
I do think your comments are right on the mark. I agree that as a country industrializes and urbanizes (usually leads to economic growth), that families tend to become smaller, largely out of necessity. As people move to the city for work and fewer farm the land, not as many children are needed in the fields.

As comments, suggestions, and questions were posted in the discussion forum, the instructor evaluated the dialogue based on the level of critical thinking and knowledge demonstrated by the students (Table 2). Thus, a typical Inquiry-based Learning (IBL) process was developed at the international level.

Table 2

Lesson 1: Example of guide checking the interaction level for some activities

GROUP Participant (S)	**HOMEPAGE CONSTRUCTION**	**PARTICIPATION CASE STUDY: BOLIVIA**	**PARTICIPATION THEME: CARRYING CAP**	**COMMENTS**	**MORE INFO**
BLUE		TOTAL: 12	TOTAL: 4	Slow start and late participation. Unequal number of interventions and very low level of interaction.	Blue group see guide
S1, China	Ok. No photo	1	0		
S2, USA	Complete	7	4		
S3, China	NO	1	0		
S4, USA	Complete	3	0		
GREEN:		TOTAL: 15	TOTAL: 5	Weak participation of one member and late participation of another member.	Green group see guide
S5, China	Ok. No photo	1	0		
S6, USA	Complete	5	2		
S7, USA	Complete	9	3		
RED:		TOTAL: 16	TOTAL: 3	Good interaction during the first Disc. Forum. Participation for the second task was weak.	Red group see guide
S8, China	Complete	5	0		
S9, China	Complete	5	2		
S10, USA	Complete	6	1		
YELLOW:		TOTAL: 15	TOTAL: 19	Good interaction	Yello

S11, China	Ok. No photo	2	1	during both Disc.	w group see guide
S12, USA	Complete	4	6	Forums. Participation	
S13, China	Complete	4	3	was balanced	
S14, USA	Complete	5	9	with the exception of one case.	

Note: The first column represents the groups and participants. The second column represents the Web page and photograph created or not by each participant. The third column represents an exercise about population in Bolivia and the number of interactions. The fourth column represents a theme related to the concept of carrying capacity and the number of interactions. The fifth column represents a brief comment sent by the instructors to each team. The sixth column indicates that each group can see a more detailed comment by accessing their own guide.

Self-directed learning increased the ownership of work but did not increase the quality and level of involvement and motivation of the students, as students generated ideas about how to address the problem and how to identify resources that were available to help them investigate the problem. The IBL approach of the Module could develop into a problem-oriented approach. The use of Problem-based Learning (PBL) in the Module would give the students an opportunity to reflect on their own way of thinking about a situation or problem. PBL is driven by challenging, open-ended problems, where students work in small collaborative groups, and teachers take on the role of facilitators of learning (Grabinger & Dunlap, 2002; Pawson et al., 2006). This process was not detected by direct or indirect observation in the national or international interaction.

Through online interaction, the students learned how to network and work together at a distance, laying a framework for the future where students may form research groups and networks with researchers around the world based on their interests and work. There may be no opportunity for face-to-face interaction before such online interaction begins. Therefore, this technology also teaches students to become comfortable with online interaction and to express themselves in this environment.

The international component was not fully developed. The American responses dominated the discussion forum in most cases; although, some American students failed to participate in some of the lessons, perhaps due to a lack of interest. In some cases, there was no participation from the Chinese team members. However, the most active students interacted and tried to encourage their colleagues in both countries to participate. One of the possible problems faced by the American students was that the structure of the Chinese local group was not well understood.

Throughout the process, students experienced a learning curve as far as how to share digital files and how to develop the final submission for each lesson. Each participant exhibited initiative and creativity by incorporating technology such as GIS and the use of collaborative Web sites; for example, Google Docs was used to facilitate file sharing and to develop the lessons.

In accordance with the approach proposed by Lick (2000), which is that teamwork shows the willingness and ability of team members to work together in a truly cooperative way toward a common goal, in this case, a basic level of teamwork and cooperation was achieved. To some extent, it was possible to observe group cohesiveness at the national level based on a certain disposition and an ability to work together. The attraction of certain members to each other as a result of common forms of operation or previous activities developed through face-to-face academic experiences facilitated learning and internalized cooperation. However, collaboration as a representation of strong bonds and deep trust among members was not present**.**

This case was based on an approved curriculum structure; however, the organizational decisions did not include the whole spectrum of the administration of the two international institutions. Innovation took place as a part of a learning process in which the flexible learning model was supported by partial organizational support. University technical support was available to each participant, but the participants exercised mutual assistance to resolve technology issues, such as where to upload data, where to chat, and where to hold discussions. Instructors acted as true, risk-taking innovators as they fulfilled the academic requirements and ran both the national and international online interaction.

The technology platform selected to conduct collaborative learning activities in geography should facilitate, not hinder, students as they move from interaction to cooperation to collaboration. In order to improve the collaborative activities for the CGGE Population Module, simple problems that hinder performance or delay interaction could be addressed in both TRACS and Blackboard in order to facilitate the information exchange between students. The form of information exchange between students in the local group was not well understood. For example, to share work, some students used email, two created Web sites, while others communicated using Skype and the telephone. Cooperation among the entire group was sacrificed as individuals communicated with each other rather than with the group. The group as a whole could not provide input to the isolated interactions that occurred outside of the TRACS environment, so it is possible that insights were lost.

Conclusions and Remarks

The flexible learning model, systematically integrated across two platforms (i.e., TRACS and Blackboard) and including a structured teaching module, allowed a certain level of interaction between two blended groups of international graduate students. However, in addition to the social construction of knowledge being affected by conflicting schedules and the time difference between China and the United States, there was a learning curve as far as sharing information and results for each topic and lesson.

In order to reach collaboration, the different groups working together must show a reasonable level of confidence that is not only a result of mutual understanding but also of effective and complete organizational decisions. In this case, the online initiative was developed entirely by the instructors of Texas State University and Beijing Normal University, and full organizational

support, controlled by the administration, was lacking. There was only indirect support offered by the technology resource office at the U.S. institution. This kind of innovation must be supported by the administration in the future in order to reduce random acts of innovation that are initiated by risk-taking instructors.

The IBL approach developed during the online experience did not lead to a complete and efficient self-directed learning process. The problem-oriented perspective was still based on a traditional way of communicating knowledge. Therefore, to apply PBL to any structured learning module, modifications are needed. The thematic strands of each lesson are universal; however, the mode of questioning and the level of involvement of the instructor(s) must change when moving from IBL to PBL. For example, the instructor can guide the students to the appropriate tools and technology once they are identified. Also, the instructor must work to ensure the groups function as teams that are organized to obtain a result. Finally, the instructor would become a more active participant in the discussion forum, learning with the students as the problem defines what is to be learned.

Final relevancy and the application of the findings to related settings beyond this online international experience should be concerned with the level of interaction a group of students can reach. Whether or not the interaction may develop into cooperation and collaboration will depend on effective organizational support and decision-making from the institutions engaged in this type of integrated network. Furthermore, a flexible learning model of any kind will be efficient only if the curricular structure guides the students toward an effective, self-directed learning process.

References

Association of American Geographers (AAG). (2008). *Online Center for Global Geography Education*. Retrieved October 20, 2008, from http://www.aag.org/Education/center/cgge-aag%20site/index.html

Albrecht, A., & Tillmann, V. (2004, August). *E-learning and geographical knowledge construction in higher education*. Paper presented at a meeting of the International Geographical Union Congress, Glasgow, Scotland.

Battersby, J. (1997). Differentiation in teaching and learning geography. In D. Tilbury & M. Williams (Eds.), *Teaching and learning geography* (pp. 69–79). London: Routledge.

Blackboard. (2008). *Main Web page*. Retrieved February 12, 2008, from http://www.blackboard.com

Brunn, S. (2003). The new worlds of electronic geography. *Geotrópico*, *1*(1), 11-29.

Claroline. (2008). *Main Web page*. Retrieved February 12, 2008, from http://www.claroline.net/

Eledge. (2008). *Main Web page*. Retrieved February 2, 2008, from http://eledge.sourceforge.net/

Gold, R. L. (1958). Roles in sociological field observations, *Social Forces*, *36*(3), 217-223.

Gorman, G. E., & Clayton, P. (2005). *Qualitative research for the information professional* (2nd ed.). London: Facet.

Grabinger, S., & Dunlap, J. (2002). Problem-Based learning as an example of active learning and student engagement. *Lecture Notes in Computer Science*, *1457*, 375-384.

Ilias. (2008). *Main Web page*. Retrieved February 12, 2008, from http://www.ilias.de/

Klein, P., & Solem, M. (2008). Evaluación del impacto de la colaboración internacional sobre el aprendizaje de la geografía, *Enseñanza de las Ciencias Sociales. Revista de investigación*, *7*, 3-21.

Ismail, J. (2001). The design of an e-learning system: Beyond the hype. *The Internet and Higher Education*, *4*, 329-336.

Lee, J., & Lee, W. (2008). The relationship of e-Learner's self-regulatory efficacy and perception of e-Learning environmental quality. *Computers in Human Behavior*, *24*, 32-47.

Lick, D. W. (2000). Whole-faculty study groups: Facilitating mentoring for school-wide change. *Theory into Practice, 39,* 43-49.

Lo Choi Yuet Ngor, A. (2001). The prospects for using the Internet in collaboration design education in China. *Higher Education, 42,* 47-61.

.LRN. (2008). Main Web page. Retrieved February 2, 2008, from http://www.dotlrn.org/

McInnerney, J. M., & Roberts, T.S. (2004). Online learning: social interaction and the creation of a sense of community. *Educational Technology & Society*, *7*(3), 73-81.

Monahan, T., McArdle, G., & Bertolotto, M. (2008). Virtual reality for collaborative e-learning. *Computers & Education, 50,* 1339-1353. www.sciencedirect.com

Moodle. (2008). *Main Web page*. Retrieved September 15, 2008, from http://moodle.org/

Open Source. (2008). *Main Web page*. Retrieved February 2, 2008, from http://opensource.org/docs/osd

Pahl, C. (2003). Managing evolution and change in web-based teaching and learning environments. *Computers & Education, 40,* 99-114.

Pawson, E., Fournier, E., Haigh, M., Muniz, O., Trafford, J., & Vajoczki, S. (2006). Problem-based Learning in Geography: Towards a critical assessment of its purposes, benefits, and risk. *Journal of Geography in Higher Education*, *30*(1), 103-16.

Pollalis, Y. A., & Mavrommatis, G. (2009. Using similarity measures for collaborating groups formation: A model for distance learning environments. *European Journal of Operational Research, 193*(2), 626-636. doi:10.1016/j.ejor.2007.11.053.

Rice, W. H. (2006). Moodle e-learning course development. A complete guide to successful learning using Moodle. Birmingham: Packt Publishing.

Rogers, E. M. (1995). *Diffusion of innovations* (5th ed.). New York: The Free Press.

Romero, C.,Ventura, S., & García, E. (2008). Data mining in course management systems: Moodle case study and tutorial. *Computers & Education, 51(*1) 368-384.

Sakai. (2008). *Main Web page*. Retrieved August 2, 2008, from http://www.sakaiproject.org

Skype. (2008). *Main Web page*. Retrieved October 5, 2008, from http://www.skype.com

Solem, M. (2001). Choosing the network less traveled: perception of interned-based teaching in college geography. *Professional Geographer*, *53*(2), 195-206.

Spradley, J. P. (1980). *Participant observation*. New York: Holt, Rinehart & Winston.

Taylor, J., & Swannell, P. (2001). USQ: an e-university for an e-world. *International Review of Research in Open and Distance Learning*, *2*(1), 1-15.

Taylor, J., & Swannell, P. (1995). Distance education technologies: the fourth generation. *Australian Journal of Educational Technology*, *11*(2), 1-7.

Texas State University (TRACS). (2008). Main Web page. Retrieved February 1, 2008, from http://tracsfacts.its.txstate.edu/About.html

TopClass. (2008). *Main Web page*. Retrieved February 12, 2008, from http://www.wbtsystems.com/