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Students' experience of synchronous learning in distributed environments

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This article reports on a two-year ethnographic study of learners participating in multi-site, graduate-level education classes. Classes sometimes met face-to-face in the same physical location; at other times part of the class met physically elsewhere. Yet all were linked through the virtual space. Ethnographic analysis of four data types explored how the instructor and students were able to interact through videoconferencing technologies. Most of the interaction occurred between the local and distance learners by way of *cultural guides*, local students assigned to host a distance learner through Google Video chat. The distance learners were able to receive real-time attention from the instructor and were able to share differing perspectives that contributed to increased satisfaction in the course. These interactions allowed for a dynamic collaborative effort among a diverse set of actors in the field of education.

Keywords: distance learning; synchronous interaction; videoconferencing; ethnography

Introduction

Innovative technologies offer new solutions to pressing problems in higher education. For example, higher education institutions are concerned with how to best prepare students for the twenty-first century workplace, how to attract more students, especially those from underrepresented populations, and also how to provide opportunities for collaboration among educational leaders and experts (US Department of Education, 2010). Online technologies offer students the flexibility to take courses at centers of higher education without consideration for the physical location of the institutions. This ability to take courses wherever and whenever one likes is, in part, responsible for the growing popularity of online courses. In the Fall of 2008, over 4.6 million (25% of all higher education students in the United States) enrolled in at least one online course, up 19% from those enrolled in online courses in 2007 (Allen & Seaman, 2009). However, as Garrison and Vaughan (2008) assert, students still want significant face-to-face interaction, but 'not as an *extra* tagged onto the *normal* workload.' They want interaction that is 'purposeful and meaningful' (p. 187, emphasis added) and 'online learning cannot easily replace the advantages and the need of learners to connect verbally in real time and in contiguous space'

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(p. 163). Furthermore, interactive dialogue may be a crucial component of distance education environments (Moore, 1989, 1990), but only 31% of US institutions offering any distance education courses in 2006–2007 reported using synchronous Internet-based technologies and only 23% reported using two-way interactive video (Parsad & Lewis, 2008). In other words, only one-third of US institutions offering distance education courses reported using simultaneous computer-based instruction and even fewer used two-way video and audio.

Based on these statistics, higher education providers are challenged to create a new classroom environment that retains what is good about face-to-face interaction *and* incorporates online access to information and participation, allowing for flexible student learning experiences. Faculty and researchers at a university on California's central coast are experimenting with the possibilities afforded by bringing offsite students and collaborators into the classroom through videoconferencing technologies, and thereby enhancing the higher education opportunities for both distance and local learners. Using computers and the Internet, faculty and students are interacting, dialoguing, and collaborating with one another while remaining physically distanced from one another. This technology-supported context was originally designed to create learning opportunities for graduate students who could not be on campus every week – opportunities that would be comparable to the experiences of local students. The format developed, called *Synchronous Learning in Distributed Environments* (*SLIDE*), was built on the assumption that productive learning occurs through conversations among students and faculty who create knowledge together, in real time, without physically being together in the same place. In fact, in the courses described in this article, students and faculty often interacted while being physically separated by a distance of over 500 miles (800 kilometres).

Purpose of study

This article describes a particular technology-supported instructional format and reports initial findings from a two-year ethnographic study of the experiences of learners participating in multi-site, graduate-level education classes in that format. In these classes, students and the instructor met in real time every week, sometimes face-to-face in the same physical location (a classroom), and at other times with some of the class in the physical classroom and some of the class elsewhere, yet all linked through the virtual space. Additional dialogue was possible through online discussion forums outside of the regular classroom meetings. During initial analysis, we identified the benefits and challenges of the *SLIDE* format by examining multiple courses that used variations of the format. Intrigued by these initial findings, we conducted additional analysis on one course, a qualitative research methodology class. In this latter analysis, we examined the patterns of interaction among the participants at the times when some were physically present and others participated through videoconferencing and online chat.

Combining opportunities for online learning and face-to-face interaction has been referred to by different terms, including blended learning and hybrid learning. Here, we seek to raise conceptual, theoretical, and practical concerns about what is meant by online learning and what counts as a blended or hybrid learning environment. Further, we assess whether using a model such as the one described in this article can allow for collaborative, intellectual exchanges of knowledge.

Literature review

Given our interest in the nature of interaction in a synchronous, local-remote computer-mediated classroom, we first turned to the literature for evidence of the benefits of synchronous interaction. In addition, we looked at research on higher education classrooms that integrated videoconferencing technologies, since the synchronous interaction among the distance learners, local learners, and instructor was made possible through these technologies. The courses in this study were unique in that both distance learners and local learners engaged in classroom interactions in real time, as opposed to studies that discuss real-time interaction among students and the instructor in distance learning courses. Thus, we find it important to look specifically at the literature that articulates reasons why facilitating discussion and interaction is important for students who are participating as distance learners.

Defining and valuing interaction

Moore (1989) distinguishes between three types of student interaction in distance education: (1) student-student interaction, (2) student-teacher interaction, and (3) student-content interaction. Bernard et al. (2009) cite Moore and explain that both student-teacher and student-student interaction can be *synchronous*, as in videoconferencing and chatting, or *asynchronous*, through correspondence, email, and discussion boards. Furthermore, face-to-face interaction can occur between students and instructors or among students in some distance education classes when the learning environment allows for *both* synchronous and asynchronous participation. The term *blended* refers to such learning environments that support both synchronous and asynchronous interactions (Garrison & Vaughan, 2008).

Much research has been conducted on the benefits of synchronous learning in distance education courses. Berge (1999) argues that interaction among students and between the students and the instructor is essential for success in higher education. Muilenburg and Berge (2001) claim that these types of interactions are necessary for course satisfaction; and Münzer (2003) explains that, as social beings, students need interaction with others for motivational reasons. Other researchers claim that synchronous interaction can enable more efficient and effective communication, because students are able to listen to each others' voices, conversational tones, and emotional expression (Park & Bonk, 2007a), correct misconceptions (Finkelstein, 2006; Park & Bonk, 2007b), engage spontaneously (Beuschel, Gaiser, & Draheim, 2003; Fish, Kraut, & Chalfonte, 1990), get more personal and real-time attention (Finkelstein, 2006; Münzer, 2003), share differing perspectives (Bober & Dennen, 2001; Bowden & Marton, 1998; Mason, 1994), and develop a sense of community (Duemer et al., 2002). In addition, students in some blended learning classes are also able to gain access to a wider audience of participants from different age groups and employed in a variety of professions (Park & Bonk, 2007a).

Drawing on research that details the benefits of synchronous learning opportunities, Anderson (2003) presents an updated theoretical rationale for interaction, and references Daniel and Marquis (1979), who claim that a goal of distance educators should be to create a balance between independent study and interactive learning activities. Anderson concludes that educators are unlikely to find a 'perfect mix' that meets the needs of all learners (p. 1). Nevertheless, Daniel and Marquis and Anderson value interaction as a key component in the education process. Drawing

on his own observations and polling of higher education students, Anderson develops an *equivalency theorem*, which states that:

> Deep and meaningful formal learning is supported as long as one of the three forms of interaction (student-teacher; student-student; student-content) is at a high level. The other two may be offered at minimal levels or even eliminated, without degrading the educational experience (p. 4).

Based on this theorem, Anderson (2003) draws subsequent conclusions about the value of interaction. He claims that student-teacher interaction currently has the highest-perceived value among many higher education students. He also asserts that student-student interaction is critical for learning environments based on constructivist principles and for building collaboration skills. Anderson further argues that audio and videoconferencing may inhibit interaction to an extent due to the natural distance imposed by the technology.

Videoconferencing in higher education

Using videoconferencing in educational settings is not new; yet today's uses of web-conferencing and laptop videoconferencing technologies represent far greater opportunities for education than taking satellite courses or streaming lectures through the Internet. As audio and videoconferencing technologies continue to develop and access becomes prevalent, the use of videoconferencing at all levels of education is also increasing. Videoconferencing technologies often are used to enrich the distance learning experiences for students. Greenberg (2004) asserts that videoconferencing technology can be used to effectively deliver quality education to a dispersed student population. Many scholars also claim that using videoconferencing technologies for instruction is equally effective as delivery modes in more traditional classroom instruction (Irele, 1999; Sumner & Hostetler, 2002; Twigg, 2001). However, in order for videoconferencing technologies to be effective, they must provide opportunities for students to directly interact with the learning materials and with one another (Greenberg, 2004; Twigg, 2001). Furthermore, Heath and Holznagel (2002) discuss how videoconferencing can promote interaction. They explain how, through videoconferencing, students may be able to interact synchronously and work in groups to examine and discuss interpretations of the content of the course. Similarly, Burke, Lundin, and Daunt (1997) examine the benefits of using videoconferencing, claiming that it can improve one's access to other students and the instructors, and enhance the quality of experience in understanding the subject matter discussed in the class. Using videoconferencing in the classroom can overcome the challenges of communication between teacher and students and among students, and in doing do so, foster collaboration to enhance the experiences of learning communities (Martin, 2005). In addition, videoconferencing can improve students' and teachers' access to each other, which is essential for learner-centered interactions (Smyth, 2005). Furthermore, Smyth (2005) explains that videoconferencing can support interaction with peers or experts working in the field, increase flexibility of learning situations, engage remote students more 'fully, intellectually and emotionally,' and provide a sense of inclusiveness for those with disabilities or limiting geographical circumstances (pp. 11–12).

Indeed, according to Bates and Picard (2005), geographic circumstances pose no real limitation on participation in discussions, if students are able to use videoconferencing technologies to participate in a discussion at the same time, even though they may be located in different places. They argue, however, that the instructor must make accommodation for this type of participation and not assume that pedagogical practices used in traditional classrooms will be successful in this new environment. Also, when students and the instructors communicate through videoconferencing, they are better able to interact in an affective manner, because they are able to read body language and engage in dynamic discussions *in the moment*, rather than waiting for others to post or respond (Mason & Rennie, 2008). Garrison and Vaughan (2008) point out that the 'blending of classroom and online learning offers a rich and full array of communication options that range from spontaneous, free flowing verbal exchanges to reflective, well-defined written exchanges' (p. 163).

It is widely acknowledged that videoconferencing technologies in the classroom can benefit students and instructors who otherwise would not be able to interact synchronously. However, what is often missing from the research literature is a theoretically-guided and empirically-grounded study of practice, or '*what students and teachers are actually doing with technology* in often complex circumstances and how they may be adapting it in unforeseen ways to their own educational practices and priorities' (Friesen, 2009, p. 9, emphasis added). Lou, Bernard, and Abrami (2006) explain that until now, two-way video has been used mainly to support instructor-directed lecture presentation. However, they contend that future research might examine how synchronous video, such as desktop and portable videoconferencing, may be used to support student-student interactions, such as group projects, and student-instructor interactions, such as advising on projects and providing interactive feedback. The distributed synchronous classroom experience that is reported in this article provided a unique opportunity to explore these kinds of socio-educational interactions using methods aimed at identifying and understanding social practices in context.

Theoretical and methodological framework

We conceptualize the members of a class (whether local, distance, or blended) as a culture. Guided by this understanding, we explored how distance learners participated in graduate education classes often through videoconferencing technologies. Three bodies of research inform this view of classrooms: learning as social practice, classrooms as cultures, and ethnography. Below, we describe each of these areas.

Learning as a social practice

According to Lave and Wenger (1991), the theory of social practice emphasizes the 'relational interdependency of agent and world, activity, meaning, cognition, learning, and knowing' (p. 50). Also, the theory emphasizes the inherently socially negotiated character of meaning and claims that 'learning, thinking, and knowing are relations among people in activity, in, with, and arising from the socially and culturally structured world' (p. 51).

Wenger (1998) adds to this by explaining that a social theory of learning must integrate aspects necessary to characterize social participation as a process of

learning and of knowing. For him, these include *meaning* – a way of talking about our (changing) ability – individually and collectively; *practice* – a way of talking about the shared historical and social resources, frameworks and perspectives; *community* – a way of talking about the social configurations; and *identity* – a way of talking about how learning changes who we are and creates personal histories of becoming in the context of our communities. In everyday situations, people co-participate in activities, to some extent, gaining access to different modes of behavior, and thus developing certain skills. As they move between contexts, they integrate into new participation frameworks, structuring new communities of practice. These communities of practice evolve as participants both absorb and are being absorbed into the 'culture of practice' (Lave & Wenger, 1991, p. 95).

Classrooms as cultures

According to Agar (2006), *culture* 'is the ethnographic product, the result that is the translation that links the LC1 [native languaculture] and the LC2 [languaculture of the studied group]' (p. 2). Languaculture is defined by the intertwined nature of language and culture (Agar, 1994). Throughout this study, we looked at how students who attended the various classes talked about and referenced certain cultural activities; we then viewed videos to examine cultural patterns and themes identified by those students who were more familiar with the culture of blended learning environments versus those who were outsiders, or who were attending such a course for the first time. By identifying a 'rich point'(Agar, 1994, p. 256), or departure from an outsider's expectation, we sought patterns across people and events in order to make sense of what was happening in the classroom where certain students participated as distance learners during certain classroom meetings. A rich point, or discrepancy, occurs when the teacher and/or students do not share the frame of reference for what is occurring in the lesson or classroom environment.

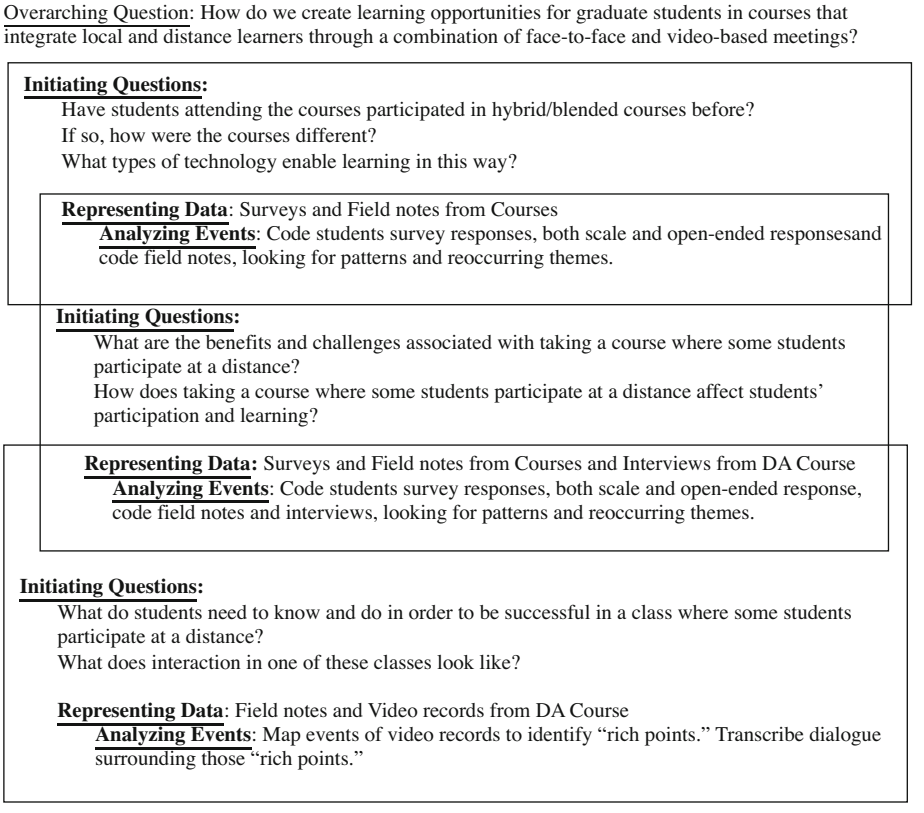
Ethnography

During the research process we gathered and analyzed artifacts through an ethnographic frame. Considerable research provides guidance on how to study classroom interaction ethnographically. The role of an educational ethnographer is to identify the patterned ways of perceiving, believing, and acting that members of a social group develop within and across events of everyday life (Agar, 1994; Anderson-Levitt, 2006; Heath & Street, 2008; Walford, 2008). Green, Dixon, and Zaharlick (2003) explain that in order to conduct an ethnographic study, 'questions are generated and identified across time and events in response to data collection and analysis conducted at different points in the study, with different actors in different places (environments)' (p. 71).The levels of collection and analysis can only be defined *in the local setting* (in situ). In addition, the ethnographer participates and observes as a way to understand what *counts* as evidence of (for example) activity, events, or practice.

As *participant observers* (Spradley, 1980), we engaged in various activities to record interaction, people, and the physical aspects of the situations from several points of view. We created ethnographic records, made descriptive observations, and analyzed our data collection at different stages of the process. We found that analyzing survey data and participating in the classes were insufficient to make

grounded claims about what was really happening in the classes. Thus, using an ethnographic framework to study the *SLIDE* enabled us to examine the students and instructors in their everyday settings, with particular attention to the classroom as cultures in the making. We were able to determine how people were making meaning of their participation, interaction, and even understandings of the classroom.

Viewed this way, ethnography is conducted through a recursive, iterative, and abductive research process (Green, Skukauskaite, & Baker, in press). That is, as ethnographers, we progressed through cycles of modifications to questions and analysis of various data (iterative) and sometimes the cycles were applied within the data collection (recursive) process. Using an abductive logic we examined the unknown without pretense or a priori assumptions about the phenomena under study, but rather generated questions, hypotheses, and in the case of this study, a means of exploring what counted as interaction between the professor and the distance learners and among the students in the discourse analysis course (Agar, 2004; Green et al., in press). Through this process we developed a logic of inquiry (see Figure 1) that guided the types of questions we asked, the ways in which we analyzed data, and how we discussed what was happening within the complexities of the classroom environment.



Note: This figure is similar to the ones used in Green et al. (2003, p. 202) representing the overlapping developing stages of data collection and analysis over an ethnographic study.

Figure 1. Logic of inquiry: Analytic process.

Study design

Study context

Although this article focuses mainly on analysis of one class, Education (ED) Course 8, research on a number of classes over the two academic years informed this study (see Table 1). All courses were part of a doctoral program in education. Although each course used videoconferencing to enable interactions between the local and distance learners, each was designed differently, had different numbers of students, and utilized different technologies. Table 1 documents the context for each of the courses that were part of the larger study. For example, ED Courses 1, 2, 4, and 5 took place in a small videoconferencing room with one large boardroom-style table and the distance learners interacted through a high definition videoconferencing unit. In ED Course 3, the distance learners participated through laptop technologies, Elluminate Live and Vidyo projected onto the screen at the front of the classroom. The videoconferencing room worked well for the classes in the Fall and Winter 2008, but it was because all distance learners were sharing the same physical space when attending the class virtually. That is, only two points were connected: the classroom at the university (where the instructor and the majority of the students were located) and one external site (where all of the distance students were located). In ED Courses 6 and 7, we tested Elluminate Live and Vidyo, Google Video, and Skype to connect students across distances.

Moreover, the focus of this study was a discourse analysis class, ED Course 8, which included 14 local learners and four distance learners – two of whom had been distance learners in earlier courses: one newly-accepted into the program, and who was connecting from home due to illness. Participants in ED Course 8 met weekly for two hours and 50 minutes for 9 weeks of a 10-week quarter. The class met asynchronously through the computer management system one week, because a national holiday fell on that particular class day. We therefore had access to nine days' worth of video and analyzed over 25 hours of video records. This discourse analysis course was a seminar that examined the nature of discourse, and issues in transcribing and analyzing talk, and considered how such analyses apply to the study of life in classrooms and other educational settings. As part of the class, students constructed an approach to the study of classrooms as discourse worlds through which teaching and learning are accomplished. They were expected to analyze segments of classroom discourse.

Considering the usability and cost of the programs tested in earlier courses, we elected to use freely available technologies (Google Video and Skype) to facilitate the four distance learners' access to ED Course 8.

Participants

Our study involves participants that were both distance learners and local learners. Two of the distance learners began the program in the Fall of 2008 and had participated in 11 courses implementing the *SLIDE* format, offered over six academic quarters at the time of this study. An additional distance learner joined the program in the Fall of 2009 and consented to be part of the study over the next three quarters. A fourth student temporarily participated at a distance in certain classes due to illness. Table 2 provides a list representing the members of the classroom

Table 1. Examined courses applying the *SLIDE* format.

	Fall 2008			Winter 2008		Fall 2009		Winter 2009
	ED Course 1	ED Course 2	ED Course 3	ED Course 4	ED Course 5	ED Course 6	ED Course 7	ED Course 8
Course	Research Methodology in Education	Technology and Learning	Advanced Learning Sciences in Education	Classrooms as Cultures	Seminar in Curriculum and Literacy	Introductory Statistics	Intro. To Qualitative Research Methods	Discourse Analysis in Educational Settings
Technology	High-definition video-conferencing unit	High-definition video-conferencing unit	Laptop Elluminate Live Vidyo	High-definition video-conferencing unit	High-definition video-conferencing unit	Laptop Google VideoSkype	Laptop Google VideoSkype	Laptop Google VideoSkype
Students	13 in class 4 at a distance	4 in class 2 at a distance	18 in class 2 at a distance	17 in class 2 at a distance	13 in class 2 at a distance	19 in class 1 at a distance	19 in class 1 at a distance	14 in class 4 at a distance

Note: Courses are numbered for quick reference. Also, distance learners participated in courses 1, 2, 4, 5 through high-definition video-conferencing technologies in a room equipped for this particular function; whereas distance learners participated in courses 3, 6, 7, and 8 through laptop technologies.

environments and their characteristics, including a pseudonym, type of learner, and profession. We chose pseudonyms that started with the letter D to represent those who often participated at a distance, pseudonyms that started with the letter L for local learners, and pseudonyms that started with the letter C for local learners who also served as cultural guides, local learners who hosted the distance learners on their individual laptops. The role of the cultural guides ultimately was to facilitate interactions among the distance learners, local learners, and the instructor of the course, a role that will be discussed in more detail in the findings from this study.

Other students attended the class, but interactions among the students listed in Table 2 were most significant for analysis in this paper. Furthermore, one author of this paper was Cassandra [pseudonym], a graduate student who was a participant-observer in the courses and a *cultural guide* in the discourse analysis class. Also, it is important to note that in this discourse analysis course, most of the local students were new to the *SLIDE* model and were unfamiliar with the previous data collection and had not attended a class with distance learners who were part of this study.

Data collection and analysis

During this two-year ethnographic process, systematic and conscious decisions were made to modify our research design and reformulate our questions in order to develop an understanding of what was relevant and effective to the context, not what we assumed was relevant in the initial stages of the study. In Figure 1, drawn from the work of Green et al. (2003, p. 202), we illustrate how our logic of inquiry developed through the research process. This logic of inquiry essentially progressed over three stages of data collection and analysis, with each stage informing what artifacts were collected and how they were analyzed. In the first exploratory stage, our work was guided by an overarching question that we hoped to answer during the study: 'How do we create learning opportunities for graduate students in courses that integrate local and distance learners through a combination of face-to-face and video-based meetings?' This question also gave us a framework for generating questions we thought students could best answer using survey data.

Table 2. Characteristics of participants in study (ED Course 8).

Pseudonym	Type of participant	Profession
Dan	Distance learner	Technology Community college system
Denise	Distance learner	Technology Statewide initiatives
Darren	Distance learner	Administration Community college system
Dirk	Distance learner (temporarily)	Graduate student
Laura	Local learner	Graduate student
Cassandra	Cultural guide Local learner	Teacher education instructor
Christine	Cultural guide Local learner	Teaching assistant
Cora	Cultural guide Videographer	Teaching assistant

Note: All participants listed in this table were graduate students, but some had full- or part-time jobs as indicated in the Profession column.

During the first year that the learners were in the program (see first set of initiating questions in Figure 1), we surveyed students in three different classes (see Table 1, ED courses 3, 4, and 5) about their knowledge of teaching and learning technologies in the classroom, their previous enrollment in an online and/or blended course, and their experience as distance learners in the classroom in terms of how it affected their learning.

For the purposes of this survey and for our study, we define blended learning as 'thoughtful integration of classroom face-to-face learning experiences with online learning experiences' (Garrison & Kanuka, 2004, p. 96). The courses considered here were termed *blended* because students participated in both face-to-face sessions (some through videoconferencing and some physically) and in asynchronous online discussion sessions.

In this first phase of analysis, we coded the open-ended responses to the surveys and looked for trends, by focusing on students' descriptions of *technology, classroom participation, interaction*, and *collaboration*. The survey data indicated that students in ED courses 3, 4, and 5 had differing points of view about what was occurring in the classroom, including (a) who was and was not able to participate fully in the class, (b) whether the technology was disruptive to the learning environment or whether it actually could be used as a learning tool to promote digital literacies, and (c) how the format worked or did not work for their particular learning styles and/or perspectives on education. Answers to the survey questions led us to a second stage of data collection and analysis (see second set of initiating questions in Figure 1).We developed a new set of initiating questions concerning the benefits and challenges of attending class in this way for both the distance and local learners. We wanted to know if students had taken a blended or distance learning course before and if so, how it might be different or the same as those they currently were attending. We also wanted to know whether the learners participating at a distance impacted what local students learned and how they participated in the class.

In the second phase, we surveyed students in ED Course 8 with the same questions used in phase one, but then selectively interviewed five students (three local learners and two distance learners) to acquire more detailed responses concerning their classroom experiences in these courses. We asked students to describe their experiences in the class and how they were similar or different to those in other classes without distance learners. We asked the distance learners the same question, but framed this in terms of how their experiences changed across the different classes from whence they participated at a distance. Then, based on their responses, we asked them to clarify or further expand on responses that mentioned how the technology may or may not have disrupted their learning and/or whether they were able to successfully collaborate with students who participated at a distance. We transcribed all of these interviews and coded them according to the same scheme as we did the survey responses.

In the third phase of analysis, we reframed the research questions and conducted a more focused look at the actions of both the local and distance learners in one particular classroom context (see the third set of initiating questions in Figure 1 and ED Course 8 description in Table 1). The ultimate purpose of this study became evident as we progressed through the stages of analysis – to make visible the cultural practices and experiences of both the distance and local learners in order to identify how social interaction occurred during the class sessions. Initially, we mapped the classroom events to represent the flow of conduct among members of

the class. An ethnographic event is conceptualized as a bounded set of activities about a common theme on a given day that results from participants' interaction (Bloome & Bailey, 1992; Santa Barbara Classroom Discourse Group, 1992). By constructing event maps of the classroom activity, we explored different analytical concepts (actions, activities, interactional spaces) in order to approach and understand what participants construct as a group, as they interacted during class time. The different concepts were identified through analyzing video data and transcripts of video data. Moreover, during each day of class, events were analytically identified by observing how time was spent, who was able to interact, with whom, for what purposes, when, where, under what conditions and with what outcomes (Bloome & Bailey, 1992; Castanheira, Crawford, Dixon, & Green, 2001; Santa Barbara Classroom Discourse Group, 1992).

Study findings

In the following section, we provide examples of survey responses that led to shifts in our research process and then detail findings from the video analysis, using segments of interview and video transcripts and field notes as additional evidence to explain the complexities of what was occurring in the classroom.

Survey responses

Over the two years, we surveyed students in four of the courses operating under the *SLIDE* format: ED courses 3, 4, 5, and 8. A total of 72 students were enrolled in those courses, but many of the students enrolled in one of the courses, were actually enrolled in the other course as well. So in fact, 46 different students were enrolled in the four courses. Of the 46 students who received the electronic survey, 27 students responded –a 59% return rate. Of the 13 questions on the survey, responses to six of the questions informed the research conducted on ED Course 8, the discourse analysis course. Questions that became irrelevant to our study asked students about their computer skills, familiarity with technology for teaching and learning, and prior experience with taking a blended learning or distance education courses. Three of the other six survey questions are presented in Table 3. These three questions required more open-ended responses, based on students' answers to questions 1 and 3.

As illustrated in Table 3 and 74% of the students stated that having distance learners in the course did not affect their participation, while 26% of the students who responded to the survey felt that the distance learners affected their participation in some ways. Those seven students who responded that the distance learners did affect their participation cited lack of interaction as evidence of this. For example, one student answered, 'It was harder to feel connected with them and carry on a two way conversation. I felt like the local learners or distance learners would often unintentionally interrupt each other.' Another student responded, 'Made it more challenging in some ways –our current technology doesn't provide the 'being in the same room' experience.' Based on responses to the first question in Table 3, we found it interesting that about half of the students thought that reading the nonverbal cues from the distance learners was the same as reading the nonverbal cues from the local learners. This potentially was because the distance learners were projected on the screens in three out of the four classes for local learners to see. ED Course 8 was the only class where the distance learners came in through laptop videoconferencing technologies.

Table 3. Local learners' responses to survey questions.

Item	Responses							
1. Did having distance learners in the course affect your participation?	Yes				No			
	N		%		N		%	
	7		26		20		74	
2. Rate your ability to read nonverbal cues of distance learners. Was it the same or harder?	Same				Harder			
	N		%		N		%	
	13		48		14		52	
3. Response to 'Did you learn as much as, more, less, (not sure) from students participating at a distance compared to ones physically in class?'	As much as		More		Less		Not sure	
	N	%	N	%	N	%	N	%
	8	30	8	30	7	25	4	15

Note: A total of 27 students answered these questions. Three out of the five survey questions are presented in this table. The other two questions required more detailed responses based on answers to questions 1 and 3.

The third survey question presented in Table 3 asked students, 'Did you learn [as much/as/more than/less than/not sure] from students participating at a distance compared to ones physically in class?' As presented in Table 3 and 60% of the students felt that they learned as much as or more from the distance learners, while 25% felt that they learned less, and 15% were not sure. The students who answered 'as much as' or 'more than' to that question, cited the value of the distance learners' expertise and the knowledge they often shared with the local students in the class. One local student stated:

> I learned a lot from the distance learners, but I think that was primarily because of the expertise and knowledge they brought with them.

Another student explained:

> I feel like I learned a lot from the distance learners, who had valuable things to add to our discussions. In particular, they are technology experts, and gave a lot of their expertise during the technology session we had in the videoconferencing center.

Dan and Denise, the main distance learners to participate in the distributed environments as part of this study and who were the focus of these survey responses, are technology experts who help make state policy decisions. In addition, Dan works directly with higher education administration on issues of technology and virtual classes at the community college level.

Those students who responded that they learned 'less' from the distance learners than they did from the local learners embodied criticisms of how effective the integrated learning environment was from the standpoint of participation and social interaction.

According to one student:

> I had very little interaction with them [the distance learners]. They spoke and they listened. People in the class spoke and listened. However, there wasn't the same conversation as there was with students in the class. I did not feel that the interaction with

> the distance students was the same as with the other students in the class. One reason for this could be that there is not really opportunity for spontaneous discussion like you have in a live class.
>
> In a live class, you have casual conversations with peers as you're on break or even with your neighbor during the class that contributes to the rapport building and collegial relationships. I did not have that with the distance students.Along the same lines, another student spoke about classroom conversation, but also mentioned the issue of nonverbal cues:
>
> I feel, in this case, that I learned less from the student participating at a distance than compared to other students in class. I was able to more easily see non-verbal cues from students in the classroom than students at a distance. It was easier to understand and interpret classroom conversations and exchanges with people who were located in the classroom.

The final open-ended question on the survey asked about the local learners' overall opinions concerning the benefits and/or distractions of taking a course with distance learners. Many of the face-to-face learners stated that the benefits of having distance learners included allowing more points of view to enter into the class discussions. For example, one local learner responded, 'It added more voices to our conversation,' while another stated, 'They [the distance learners] were more vocal than a lot of the local learners and I appreciated their differing points of view.' Some also learned about the uses of technology in these classrooms, particularly about what technologies were available for networking through chat and videoconferencing on your laptop. In contrast, many in the class expressed concern that technology was a distraction at the beginning of the class, especially when technologies were being tested; some also complained that they did not have enough interaction with distance learners. After analyzing these survey responses and others, we sought a greater understanding of the classroom dynamic by analyzing video records from classroom interaction where at different times up to four students participated synchronously in up to two different distributed environments.

Video analysis

From the video analysis we found that on most occasions the distance learners were present in the classroom, either physically or through videoconferencing technologies on the laptop. During one class period, however, one of the distance learners was unable to participate due to a scheduling conflict that she could not control, and during another class period, one of the distance learners was unable to participate in class because of illness. Table 4 illustrates when and how the distance learners were able to participate in the class.

Evidence of interaction between the students participating from a distance and the instructor is discussed in the transcript below (Table 5). This interaction appears in the transcript because the camera, as positioned on a tripod at the back of the room, was unable to capture this interaction in the moment-to-moment unfolding of the class.

The transcript from Table 5 indicates how the technology allowed for interaction among the students and between the students and the instructor. Line 15 sets the context, stating that the local and distance students were engaged in a discussion,

Table 4. Type of participation by distance learners over the 10 weeks of class.

Type of participation	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
Physically in classroom	Dan Darren				Dan Denise Darren				Dan Denise Darren Dirk	
In distributed environments	Denise Dirk	Dan Denise Darren Dirk	All*	Dan Darren Dirk	Instructor*	Dan Denise Darren Dirk	Dan Denise Darren Dirk	Dan Denise Darren Dirk		Dan Denise Darren Dirk

*Note: On Day 3, all class members participated at a distance and asynchronously through the discussion forum on the course management system because it was a national holiday. Also, on Day 4 the instructor was home sick and chose to come in as distance participant.

but the instructor was aware of 'where' they were (line eight), meaning physically where the laptop was that was hosting them. The instructor initiated interaction with them and continued to talk to them about their project through the external speaker. Furthermore, Dan noted that over time, the instructor developed an 'interesting maturity' (line 27) in how she initiated interaction with the distance learners participating in her courses.

Beyond the more casual interaction as described in Table 5, we found additional examples of interaction between the instructor and the distance learners from observing the video records and transcribing the moment-to-moment interaction as it occurred (see Table 6). One type of interaction, made visible when the instructor called on the distance students, concerns how they took turns introducing themselves to the guest participants. After the local learners introduced themselves, the instructor announced to the guest fellows (line 67) that three additional students were participating in the class, though they may not have been visible to them in the physical space. The instructor spent a significant amount of time on the first day of class introducing the students who would often be participating from distributed environments and explained the nature of the research project, so that the students who were physically in the class would be aware of the integrated learning context. But, for guests not familiar with this classroom culture, it was necessary for the instructor to expose their presence before calling upon them to introduce themselves.

The instructor also interacted with the distance learners by calling upon their expertise as revealed in the dialogue on Day 7. On this day a guest speaker was sharing her research with the class. Toward the end of her presentation, she asked a

Table 5. Excerpt from interview with distance learners.

Name	Dialogue from transcript
Dan	8 Because she [the instructor] knows where we are
	9 and she will come over and address us at appropriate times
	10 um
	11 so that I feel a very strong connection with [the professor] and the rest of the class
	12 when she does that
	13 And it is not like you have to do it all the time
	14 but you know
	15 when we are having a class discussion about our project
	16 she'll come over
	17 and pick up the speaker and look at the monitor
	18 and uh
Denise	19 Did you notice that yesterday
	20 She picked up the speaker thing
	21 and she was sitting there talking with us with the speaker thing in her hand
	22 I thought it was
Dan	23 It was great
Denise	24 It was totally funny
Dan	25 Yeah
	26 but it was really an interesting change
	27 and it's an interesting maturity in how we are working together

Note: This transcript was taken from an interview with Dan and Denise and represents a description of an episode that occurred in the classroom.

Table 6. Excerpts from class transcripts across different days.

	Pseudonym	Dialogue from transcript
Day 2	I	67 We have 3 other people here [guest fellows]
	Cassandra	68 Can you hear us
	Denise	69 Yeah
	I	70 Ah you are very clear today
	Denise	71 Good
		72 We'll hope the words are clear too
		73 Not just the sound [students laughing]
	I	74 Nice distinction
	Denise	75 I'm [Denise]
		76 I'm a 2nd year student in the MA/PhD program
		77 in technology in teaching and learning
Day 7	I	78 Let me ask [Dan] and [Denise]
		79 You are working in virtual environments
		80 Are people considering any of these questions
		81 in the stuff you are reading and seeing and developing
	Denise	82 There used to be an assumption when you said online education
		83 It was a fixed model
	Dan	84 Asynchronous yeah
	Denise	85 But that's changed a lot over the last few years with all the development of new technologies [. . .]
	Christine	123 [Raising hand]
		124 I have a comment from [Dan] and [Denise]
		125 'The video itself acts as a artifact
		126 the tools that let us analyze the video
		127 emphasizing the tools for me.'
	I	128 Are you interacting with
		129 [Dan] and [Denise] aren't you really interacting with somebody that built it
		130 So that when something goes wrong you think
		131 you were really stupid for building it that way
	Denise	[Laughing]
		132 We would never say that
	Dan	133 You lie!

Note: 'I' represents the instructor and the other names are pseudonyms given to the participants. See Table 1 for a description.

question to the group. The instructor intervened to ask for Dan and Denise's responses to the question (line 78), specifically looking for evidence from their professional experiences (line 79).

Furthermore, the students participating in distributed environments were able to initiate interaction with the instructor through a cultural guide, or student host, that is, facilitating this participation through Google Video chat, also on Day 7. The students, Cassandra (line 68) and Christine, (lines 86–90) are those cultural guides. On Day 7, as represented in the last columns of Table 4, Christine raised her hand to indicate that there was a question about the final project (line 123). It is not her question, but rather a question coming from two of the distance learners who happened to be in the same physical space on that day. She was aware that Dan and Denise had a question, because they had signaled to her through the chat feature of the videoconferencing technology that they wanted to share what they had learned from analyzing video for their particular project (lines 124–127). In this situation,

Christine read their response from the screen, rather than having them speak directly to the class.

Aside from finding evidence of defined patterns of interaction in the classroom, we also found a major discrepancy between how one distance and one local learner characterized the interaction between the different groups of students in the discourse analysis course (see Table 7). These different points of view represent a 'rich point' (Agar, 1994, p. 256), a point where cultural patterns, practices, and knowledge become visible (Baker & Green, 2007), thus providing a basis for developing

Table 7. Excerpts from separate interviews with Dan and Laura.

Dan (distance learner)	Laura (local learner)
28 I would probably look at this and say you know	49 One of the big things is the casual conversations that get taken up with the classmates in a live situation
29 because I can interact remotely after hours	
30 after class	
31 in some of these classroom projects	50 and you don't really have that rapport building
32 then I have the opportunity to interact in different	
33 and sometimes very profoundly good ways with other students	51 I could whisper something to you in class
	52 or say
34 because the distance connections in some strange way	53 I read that
	54 or what the heck is being said here
35 facilitate the breakdown of the normal social borders	55 or
	56 I can have those conversations when we walk to the coffee cart at break time
36 that would make it more difficult to develop those working relationships quickly	57 and you just don't have that with the distance learners
37 In a strange way	
38 you are willing to chat online	58 and for me
39 or over the phone	59 it kind of segregates them
40 in a way that you might not be comfortable in a f2f classroom	60 I didn't feel like they were
	61 I think if you have a hybrid course like that
41 where you are trying to figure out who you can talk to	62 and you have some that are not there
	63 you have to make an effort to discuss
42 and who you can't	64 to include them in a different way
43 because the system actually sets it up to be democratic	[and later in the interview]
	65 I don't foresee myself developing a relationship with someone who I actually haven't met
44 It sort of resets everything to a democracy	
45 where everyone starts out at the same place	66 face-to-face
46 and you may speak	
47 or someone may certainly speak more quickly	
48 but it kind of changes the dynamics of that in a positive way	

Note: Although these excerpts are represented side by side, they were drawn from separate interviews. Having the transcripts posted next to each other allows for a contrastive look across the perspectives.

new insights into the impact of bringing students together from distributed environments as we analyze classroom life recorded on video.

Dan clearly benefited from this medium. It enabled him to participate in the class, and he had to worry less about the social concerns of who may or may not engage him in dialogue about the class (lines 35, 41–42). He already had three team members for the final project, those students who also are participating at a distance. Also, when the team interacts and collaborates on the project outside of class, they do so through conference calls, videoconferencing technologies, chats, and Google Docs (lines 29–31 and in additional interview transcripts). Since the group is small and because of the collaborative nature of the project, the students must 'talk' (line 41) to interact in order to work through the video analysis project for the class. Dan sees this model as 'democratic' in that it allows each participant to interact equally (line 44).

On the other hand, Laura presented what she considered a privileged view of being in the classroom physically. She wanted all the members of the class to be equally accessible, so that she may strike up casual conversations she sees as necessary for rapport building (lines 49–57). She seemed to feel that without the face-to-face interactions in the same physical space, some students were segregated (line 59). And, Laura does not plan to engage with the distance learners (lines 65–66), as that would take a different kind of effort (line 63). This discrepancy represents the need for further examination of the types of interaction that videoconferencing enables and how students' roles and relationships support or constrain that interaction.

Discussion

Due to the design of this synchronous learning environment, professionals were able to participate in classes they would not otherwise have access to because of their intense schedules and of being employed in a city over 500 miles from the university. Videoconferencing allowed the distance learners to have the experience of a face-to-face engagement, without them having to be in class physically. Consequently, participation in this context meant that the distance learners were able to have a presence in the classroom. They were able to see and hear as peer classmates because, as one distance learner indicated, 'the technology allows us to be visible, but not more visible. We want to be equally visible, but not intrusive.' This quote hints at earlier courses in which the students met in either a videoconferencing room or a more traditional classroom, where the distance learners were projected on a screen as larger-than-life participants that were sometimes seen as a distraction (see Table 1).

Ongoing conversations among many different participants made the study of this *SLIDE* project possible. Through these conversations and through different layers of analysis, we found that students can be more than just students. For example, Cassandra and Christine, local learners in the classroom, also served as cultural guides, who hosted and facilitated the distance learners' participation and interaction through their laptops.

Using videoconferencing technologies in the classroom allowed students coming in from a distance access to learning that most closely resembles face-to-face teaching, but the instructor has to make pedagogical decisions to accommodate this type of participation (Bates & Picard, 2005). In the case of the discourse analysis class,

the teaching assistant posted all classroom materials on the computer management system and constantly updated the site. She also set up a discussion forum so that students were able to continue conversations after class adjourned and were able to asynchronously collaborate with other group members on the class project. Also, the instructor consciously involved the distance learners in the dialogue by calling on them to share their professional experiences, responses to the readings, and progress on the project.

In addition, we found that the videoconferencing did promote interaction between the instructor and the students in the distributed environments (Heath & Holznagel, 2002; Smyth, 2005). Students who participated at a distance were able to interact with those physically in the classroom, but the interaction occurred mostly between the distance learner and the cultural guide hosting the student through the laptop. In other words, through analysis of the video records we found no evidence of the distance learners speaking directly to other local learners (who were not cultural guides) or of local learners speaking directly to the distance learners. Therefore, there was little evidence of 'spontaneous, free flowing verbal exchanges' (Garrison & Vaughan, 2008, p. 163).This happened, most likely, for two reasons. First of all, most of the students in the discourse analysis course were new to the *SLIDE* model. The only students who were familiar with how the distance learners participated in class were those chosen to be the cultural guides. Secondly, evidence of interaction between the distance and local learners in the classroom environment was limited because the instructor allowed the distance learners to work together as a group; therefore all interaction and collaboration on the project occurred in another virtual environment, one that was not filmed. From the interview with the distance learners, we found that their group met often by conference call technologies and collaborated through Google Docs. Although we have no video record of this interaction, we were able to extract evidence from the interview with Dan that such interaction did take place through 'working relationships' with others in the class (see Table 5).

The distance learners also were able to get personal and real time attention (Münzer, 2003) when they discussed the progress they were making on their project and they were able to share differing perspectives (Bober & Dennen, 2001; Bowden & Marton, 1998; Mason, 1994) when they discussed the assumptions about technology models in relation to what questions educators were asking in the research (see Table 6). Nevertheless, as Anderson (2003) claims, instructors can never get the 'perfect' mix, because some local learners have differing perspectives about what counts as education and how interaction should unfold in a classroom (see Table 7).

Thus, *communities of practice* (Lave & Wenger, 1991; Wenger, 1998) developed as a result of interactions among the various actors. Through this social participation, the students, both local and distance, along with the instructor, constructed *meanings* or ways of talking about learning through virtual environments (see Table 6, Day 7) and *practices* or ways of interacting with each other through the video-conferencing technologies (Wenger, 1998). In addition, students and the instructor formed new *identities* through interaction and co-construction of ideas (for example, see Table 7 for Dan's explanation). However, not all local students shared in this transformation. Laura was absorbed in a social configuration that developed among local learners in the classroom, but because she lacked a personal history with the distance learners and did not have continuous interaction with them when they physically attended class, she remained outside the community of

practice, which included the distance learners, the cultural guides, the instructor, and some of the local learners who previously had attended class in the *SLIDE* format. Nevertheless, both students and the instructor often spoke of the videoconferencing technologies as 'good enough' and that the interaction did enable a rich learning experience for the distance learners and many of the local learners (Greenberg, 2004).

Arguably, one limitation of this study may lie in the fact that the instructor of the ED Course 8 class had previously taught and worked with the distance learners. Since the instructor knew the students through prior classroom experiences and because she knew what they hoped to accomplish in this course, but also through attending the graduate education program, the instructor knew when to include them in the conversations and what kinds of questions to ask, thereby enhancing their learning opportunities. Another limitation to this study arose out of the fact that we analyzed video from only one class in which students participated in distributed environments, so much of our data represents findings for that specific context. Yet by supplementing this video data with survey responses, field notes, and interview sources, this study yielded a rich collection of data. Thus, through an iterative, recursive, and abductive logic of inquiry (Agar, 1994; Green et al., 2003; Castanheira et al., 2001), we were able to induce these findings from the wealth of data collected during different phases of this ethnographically-framed study. By simply reporting findings from the survey and interview data, we would have had very little depth of information. Of course, we would have been able to report differing opinions about whether local learners were able to interact with the distance learners and whether local learners *felt* that they were able to learn as much from the students participating from a distance compared to the ones physically in class. However, by using students' survey and interview responses to inform analysis of video from a course operating under the *SLIDE* format, we were able to determine what opportunities for interaction were afforded the distance learners and under what conditions they were able to engage with the instructor and local learners in the class. These insights gained from this type of research are missing from the current studies on the benefits of synchronous learning and videoconferencing in distance education.

Concluding remarks

What is unique about the context described in this study is that during the first quarter of classes, in the Fall of 2008, the distance learners attended a technology seminar (ED Course 2 in Table 1), with a group of four local learners who shared common interests, participating mostly through web conferencing technologies. Ultimately, this course provided an intimate environment where we were able to share ideas about the benefits and challenges of attending class through videoconferencing technologies and built this research project around those discussions. Consequently, the interactions shared among the local and distance learners and the professors from the different courses allowed for a dynamic collaborative effort among a diverse set of actors in the field of education – graduate students, educators, researchers, and policy professionals.

In this sense, these interactions provided a truly blended learning experience. As we see it, as long as discussion about the blended learning is confined to the classroom experience, and more specifically to claims about classroom experience, there

will be a limited number of stakeholders and a limited appreciation of the potential positive outcomes of blended learning opportunities. What this part of the study shows is that when groups such as the ones described in this study are able to meet together weekly, regardless of where they are located physically, to construct new ideas and new ways of understanding *synchronously*, it enhances not only the educational experience, but also the professional experience. In other words, it is not just that blended learning environments provide a better, more enhanced learning experience for the students attending class, but also that they allow those in the public sector to maximize their professional experiences by engaging in discussions about the technologies they are trying to promote. *SLIDE* represents a sort of give-and-take model: professionals contribute knowledge and ideas of what is going on in their field of expertise, and educators and researchers give back to the community by providing the theory and practice connections that transfer to their everyday professional interactions and the language to have more productive conversations around those intersections. As someone who works directly with policy makers to advocate more innovative and creative models for teaching with technology, one distance learner describes her need for the interaction in this way:

> I didn't have a language to use to describe why it [a particular innovative model] was powerful learning or why they should invest in it, so I came back to school to develop a language that could fit better with certain audiences in this new way of working in education. And, it has been an education both [of] the content of what I am learning in the class and then the real experiences of drinking my own cool-aid by participating in a hybrid mode. I have come to realize that we're, all of us in this class, actually pioneers in the future approaches to teaching and learning and there is a lot to learn.

This study suggests that *SLIDE* can offer learning opportunities for graduate students that combine the advantages of interaction and face-to-face learning and the advantages of video-based distance-learning meetings. Its findings contribute to a greater understanding of how to effectively integrate distance learners into classrooms where interacting synchronously is key to enhancing one's learning experience. As we continue our study, it will yield more information on how *SLIDE* can be designed to help enhance learning for both the distance and the local learners, further detailing what supports and constrains this technologically-enabled model and how roles and relationships among learners are constructed to support a common learning space. In particular, we plan to analyze the video records further and collect other ethnographic artifacts to determine what accounts for the discrepancy in how interaction was characterized by one distance learner, Dan, and one local learner, Laura, in order to make visible the roles and relationships among learners that were constructed to support a common learning space. In addition, we plan to record other courses where students come in at a distance at different points in the quarter to contrast how interaction and the roles and relationships constructed in those contexts may be different. We believe that opportunities to engage in synchronous distributed learning environments of the kind described in this paper will enable increasing and more diverse groups of students to gain access to higher education, and specifically graduate education, in the future.

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