Reaching Rural Communities: Videoconferencing in K-12 dance education

In education, Videoconferencing (referred to as VC from hereon in) provides students access to opportunities to interact with specialists in all fields without ever having to leave their classroom or dance studio (PL 2005, Jansen 2004, Parrish, 2005). Unlike asynchronous technology, such as Blackboard, VC permits immediate face-to-face interaction, which may make these delivery systems ideal for danced instruction. Popular VC systems, Polycom and TANDBERG, are IP-based, where the information (voice, data, and video) is bundled together over the Internet. VC connections can be separated into two types: point-to-point calls and bridged calls. Point-to-point calls allow a teacher to connect directly to another site, while bridged calls allow many users to participate in a videoconference. A VC system has two TV screens, which allow students to see themselves on one screen and the dance teacher on the other. The second screen can be used interchangeably by the teacher to display a PowerPoint presentation, or to share a document using Elmo (a flatbed projection surface), or to view a video or DVD. At a distance, the dance teacher can watch the class perform a dance, provide coaching tips, lecture, ask questions, discuss solutions, and conduct guided improvisations.

VC centers operated within schools and school districts have become more readily available. However, the cost ($20k - 60k) can be prohibitive. Room-based VC units require cameras, video encoders, microphones, and a special network infrastructure. A room VC system, as used in the iDance Arizona (iDA) research, can host multiple users from up to four different locations. Students are able to go

on a virtual field trip to the science center, the aquarium, and even to the Capitol Building in Washington D.C.

The benefits of VC in education are varied. These include providing access to resources not found in rural communities (Schwier & Balbar, 2002; Pachnowski, 2002); highlighting the importance of technology in professional practice (Arnold, et al., 2002); and expanding students' connection with the outside world by breaking down economic, geographic, and socio-political boundaries (Martin, 2000; Martin 2005; Collison, et al., 2000; Grabe & Grabe, 2000; Belderrain, 2006). Other benefits of VC include improving communication and motivation (Austin et al., 2003; Bates, 2005); encouraging active learning and interactive problem solving (Scanlon 2003; Cornelli, 2004); increasing the depth and independence of learning (Laurillard, 2002; and promoting multimodal and visual learning (Martin, 2000; Gilman & Turner, 2001; Kock, 2002; Smyth, 2005); enhanced collaborative learning; (Bates, 2005) and increasing the depth and independence of learning (Laurillard, 2002).

As research in VC continues to demonstrate educational success, new delivery models are formed to include the performing arts (music, theater and dance). Access to a global dance community heightens students' perceptions of dance. Without geographical boundaries, students see beyond themselves and their surroundings and enter dialogues with the world (Parrish, 2004; Parrish, 2006). In dance, where the body is the vehicle for expression, VC may be the right tool to capture and transmit human movement. One of the most valuable aspects of VC is that students can collaborate, discuss, improvise, and perform with individuals from

around the nation. VC enables them to share their knowledge, experience, and ideas with one another.

Research in dance VC incorporates various technologies. These include research in innovative VC for dance training practices including improvisation and choreography (Garland & Naugle, 1999; Parrish, 2001, Mandile, 2004; PL, 2004; Jansen 2005); expanding technical training and performance coaching (PL, 2004; Jansen, 2004); and web casting rehearsals and workshops (Parrish & Lane, 2003; Parrish, 2006). A few notable research projects include *Dance in Australia and New Zealand: DANZ; Interactive Gateway*; *Bridging the Gap: Connecting High School and University Dance Worlds;* and *The Performance Lab. DANZ* (Mandile, 2004) used VC to bring diverse groups together and to promote cultural understanding in dance education. *DANZ* participants collaborated in sharing ideas, planning activities, and solving problems to gain cultural understanding. *Interactive Gateway* (IG)(Parrish & Lindholm-Lane 2003) employed VC to broadcast educational resources including dance workshops, interviews, and performances. Participants logged on to have an inside glimpse of a dance rehearsal process. IG web casting served as a viable way to uncover the mystique of the rehearsal process and provide access to specialists when there was none otherwise. In *Bridging the Gap*, (Kasch, Enders & Parrish, 2004), VC was used to share, create, and perform their concerns, questions, and thoughts about their futures in and beyond dance with university and high school students. The Performance Lab (PL) (Performance Lab, 2005) developed a technology network (the first of its kind), for interactive exchange in the arts. PL used VC to coach dance and other performing arts over distances.

In 2005, I met Jill Dingman from Central Arizona College and discussed available options for iDance Arizona (iDA) school partnerships. Following the work of other dance scholars, cited above, I began to envision iDA as capable of meeting the needs of rural communities and a promising alternative to traditional dance instruction. Dingman, Project Director of the "Enhancing Education through Technology," a Title IID technology grant, invited our iDA team to a two-day training seminar where I presented the iDA research project. We met 10 teachers who were interested in bringing iDA into their classrooms. We selected the final school sites based on the needs of the students, the level of support expressed by the teachers and administrators, and the capabilities and limitations of the schools' VC spaces.

The iDA research was funded through grants and support from the U.S. Department of Education Title IID Technology Grant, Arizona State University, ASU Artsbridge America Program; ASU Applied Learning Technologies Institute; the Eloy Arizona School District; Central Arizona Colleges VC personnel and facilities; Jill Dingman ; and Bill Steber, Technology Coordinator from Eloy, AZ.

This paper reports the findings of a yearlong study using VC technology to teach elementary and junior high school students' dance. This includes an examination of the VC curriculum, pedagogical methodology employed, students and teachers' attitudes toward VC, and their perceived value of the instruction and discoveries, as well as recommendations for future use. The research focused on the following questions considering the use of VC dance instruction in rural communities: Could VC capture the three-dimensional expression of the body in movement? Would the "flattening" of VC hinder the students' ability to see, and,

therefore to learn, perform, and choreograph dance? Are traditional dance activities, such as technical instruction, improvisations, and dance, making possible over VC? Could dance sharing, self-reflection and dance critique occur within the VC environment? Would VC diminish the exchange between the dance teacher and the student?

Developing a relationship between the iDA personnel and the teachers and students from Eloy was critical. Once the participating teachers were identified, curricular interests were shared and interdisciplinary themes in the iDA dance curriculum were selected. The common curricular unit for all the teachers was systems of the body. In preparation for the VC sessions, the iDA team went to Eloy, Arizona to visit the schools and to meet the students, teachers, and administrators. We gave a dance seminar to each class, where we established benchmarks and taught basic pedagogical strategies. We demonstrated some activities and dance terms that we would be using during VC. The lessons include guided improvisation, mirrors, shadows, and body shapes, making a repeatable sequence of dance, and dance sharing.

The iDA research occurred at the Center for VC in Eloy, the Curial Primary School gymnasium in Eloy, and the Commuting Commons VC facility at Arizona State University. Eloy, Arizona is an isolated rural community with a population of 9,000. The Eloy School District has approximately 2,500 students, 85% of whom qualify for reduced free lunch (AZ Dept. of Education, 2005-2006). The student population consists of 80% Hispanic, with 64% using Spanish as their home language. The median household income is $28,494, leaving approximately 28% of families and 32% of the population below the poverty line. ASU in Tempe, Arizona

is 90 miles from Eloy. It is one of the largest universities in the US with over 45,000 students enrolled.

The VC facility at the Curial Primary School in Eloy includes a large free-form room configuration with a seating capacity of 45. It has Polycom VSX7000 videoconference equipment with an IP connection at 384 (128 – 768 range) speed (figure 1). The VC facility at ASU is a small room, capacity of 25, with a conference table in the center of the room that was disassembled for each session (figure 2). They have a Tandberg 6000 video conferencing unit with control panel - dual 32" NTSC monitors capable of receiving both ISDN (h.320) and IP- (h.323) based conference calls.

figure 1: iDA researcher Lindsey Bauer at the VC center at Eloy Junior High School.

figure 2: Dr. Parrish connecting to the Eloy Junior High School from the VC center at ASU.

The iDA goals are to enable students to experience dance as a kinesthetic means of communication and comprehend that the body is the vehicle for expression. Students explore dance technique, create original dances, and observe the value of their own and others' choreography. The iDA integrated curriculum employs interdisciplinary constructs as a vehicle for student inquiry, exploration, and dance making. The framework reflects a conceptual approach to dance education in which

the elements of dance, dance inquiry and exploration, dance making, dance sharing, and dance analysis are fostered. The content theme is the human body, including muscular, skeletal, respiratory, and circulatory systems. The iDA curriculum is designed to complement the students' learning in science, health and dance and addresses state and national standards and benchmarks for both dance and science content. In each class, students examine an aspect of a curricular theme, explore modes of embodying that theme, and create dances. Each class ends with an informal dance sharing or performance followed by students' observations and reflections.

A variety of instructional methods were employed, including directed improvisation, responsive dancing (mirroring and improvisation), dance technique, interactive games, manipulative cards, and props (elastic bands, colorful fabric and large spandex fabric tubes). iDA developed several new strategies for the VC environment, including a series of hand signals, numbered locations in the classroom and motif warm-up symbol cards. Other teaching materials employed in this framework include PowerPoint, Elmo document projection, and videos of human body systems. Each class used the following format: exploration of movement concepts, discussion of curricular themes, explanation and manipulation, dance making, and dance sharing.

Four classroom teachers were selected: two third-grade teachers from Curiel Elementary School; and one seventh -grade and one eighth-grade teacher from Eloy Junior High School. The study included 36 third-graders, 17 seventh-graders, and 21 eighth-grade students. Knowing that this would be an exciting technology

pedagogy study, I asked three ASU dance education students to serve as my research assistants.

Timeline 2003-2006

2003-2004 U.S. Department of Education Title IID Technology Grant submitted and awarded to the Eloy Partnership.

February 2005 VS centers built in Eloy school district at Eloy Junior High School

September 2005 Tech Academy workshop at Central Arizona College

September 2005 iDance Arizona Grant awarded

October 2005 - December 2005 Phase I -24 VC sessions (6 per class) and 16 live dance classes (4 per class) were conducted with two third-grade classes, one seventh-grade and one eighth-grade class. VC and live movement classes were 40-50 minutes in length.

January - April 2006 Phase II - 12 VC sessions (6 per class) and 8 on-site visits (4 per class) with two third-grade classes.

Over the course of the iDA research, there were a total of 36 VC sessions and 24 live dance classes in Eloy. Participants attitudes, behaviors and skills, and the iDA curriculum methods were assessed using data collected from various sources, including observation and reflective journaling by all participants, single subject interviews with students, administrators and the classroom teachers, and iDA team debriefing sessions. General and focused observations were used to record the behavior of the teachers, students and ourselves. Our iDA team journals provided

an opportunity for thoughtful reflection during the investigation. A combination of descriptive and focused questions were used to gather information about the students' dance experiences, their perspectives of VC, and their interest and experience in iDA. Specifically, interviewing was helpful, as it revealed teachers' and students' understanding, reasoning, and viewpoints. Interviews offered the students a chance to explain their responses and to elaborate further, which in turn brought new ideas and issues to the conversation. After each session, the iDA team discussed the experience by sharing particular challenges, discoveries, and issues. These team discussions were critical to the continued evolution of the curriculum and methodology, allowing for greater adaptability in the teaching process. Data from these sources was triangulated to gain an understanding of the usefulness of VC in dance education instruction. Analysis of the curriculum and teaching methods was ongoing.

The data demonstrated numerous discoveries in the process. All participants felt that the VC was valuable. VC as experienced in iDA supported the learning of dance, which was both creative and three-dimensional. This study did not investigate which method of dance instruction (VC or live instruction) was more effective, but rather looked at how essential content in dance instruction might be taught using VC. There appeared to be heightened awareness of the creative potential of dance. VC exposed students to a diverse community of dance, which is centralized and available around the nation and successfully created positive relationships among students and teachers.

The results from the interviews indicated that VC granted access to instructional content, university experts, exceptional dance education students, and

specialists (figures 3-4). Considering the importance of access, one seventh-grade student revealed, " [when we videoconference], they [the teachers] were right *here* [as he pointed to the screen]. It was great. I'd never seen nothing like that. I never knew that those kinds of moves existed." Access is academically advantageous, as it grants new opportunities and opinions. All participating teachers and administrators were eager to continue the project to identify the need for their students to be exposed to a world of greater opportunities and technological innovations. One teacher elaborates, "iDA provided a valuable opportunity for my students to become aware of the world beyond Eloy, Arizona." VC, as utilized in the iDA curriculum. represents a powerful tool to address geographical isolation, a reality for students in rural communities. One student expressed iDA's value as a real world application of VC technology and iDA's impact on his learning and worldview, saying, "Eloy is really small . . . .With iDance I was able to see more and learn new things that are not here in this small town . . . . [Through VC,] I could even talk to people on the other side of the world."

figure 3. Dr. Parrish leading mirroring activity with third graders from Eloy Elementary School.

figure 4. Dr. Parrish leading card warm-up activity with third graders from Eloy Elementary School.

We celebrated the completion of iDance by inviting the students to come to ASU. They toured the campus sites, ate lunch in the union, and performed their dances in the large performance space. In their interviews, many students described getting to know the college students and visiting the campus as a significant experience. By closely working with the iDA team and visiting a university campus, these students were able to get a glimpse of college life and a larger world beyond Eloy. iDA VC served to broaden the students' concept of community and their involvement in it .

While VC eliminated travel time and the expense of commuting, would the VC delivery system hinder the quality of exchange between student and teacher? The formation of responsive relationships took time and involved understanding both the expectations of the students and teachers and the comfort within the delivery system. At the beginning of the project technological challenges, especially the 3-second audio/video delay, hindered the formation of relationships across the miles. In individual interviews, students expressed frustration with the technology. One teacher observed, "Sometimes it was difficult to see the teachers. We just had to wait till the picture [got] better." Isolation was felt when the technology failed: "When the screen froze, we could not see anything. The class did not know what to do. We would have to dial you up again and hope it worked." Challenges with the volume control of recorded music and anticipating wait time for student responses to our questions, comments, and feedback during the sessions took time for everyone to get used to. Quickly, we learned to speak very clearly into the microphone and developed a series of hand signals to assist VC classroom management.

At the start of the research, several of the older students dropped out of the iDA program perhaps due either to the dance content or to their feelings of vulnerability as a consequence of perceived overexposure by the medium. However the great majority of students were excited by the potential of the technology and eager to be connected to and seen by others. "It's like I'm a star on TV." One student discussed how the projection screen offered him a new perspective on his body. "It was so cool seeing myself moving. It was weird at first, but now I kind of like it. With the big screen copying my moves, I feel my dancing differently." The two age groups responded to VC differently. Intent on being seen by the teacher, the third grade students clumped together in front of the camera, while the older students congregated in the back of the room just out of range of the camera. As the VC sessions continued, the middle school students' shyness diminished, and their personalities began to emerge, while the third graders learned that the iDA teacher could see everyone in the class (figure 5-8).

figure 5. Third graders listen to partner's heartbeat and dance to the rhythm of their heart.

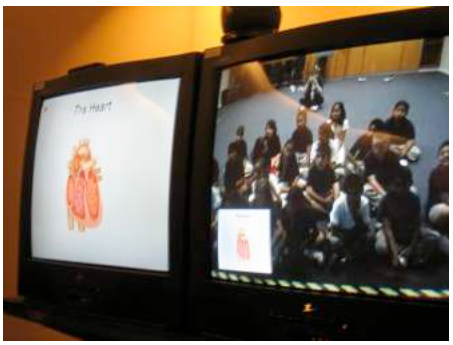

figure 6. Eloy Elementary School students view a PowerPoint lesson on the circulatory system.

A lack of personal connection hinders the formation of relationships and is particularly fragile within the context of VC, given the challenges of dropped

images, defragmentation, and pixilation. At times conversations were choppy with silence and waiting. When asking a question, a 3-second delay would occur between the question and the students' responses to the question. It took time to become comfortable with the uneven flow of communication; specifically, we had to be patient and wait for the students to respond. After the first few stilted and awkward connections, the technology improved and a more natural pacing began to occur, giving way to more easygoing, warm interactions. In the process, the iDA team paid close attention to our tone of voice, body language, and verbal and non-verbal cues.

When asked to describe the iDA teachers, most students said they were cool, kind, smart, interesting, funny, and warm. Such personalized statements reflect on the social presence possible through VC. Eloy students described how the iDA teachers cared about their ideas and their dancing. One seventh-grader expressed experiencing closeness during the iDA VC program: "Just because you can't touch them [the teachers] doesn't mean you can't know them….. In VC we can talk to each other and make real close relationships."

Videoconference technology recasts our teaching methodologies, planning, directives, and conversation cues. We discovered that timing, point of view, and articulate directives were critical. When asked whether students would prefer a traditional dance teacher or a VC teacher, 100% of the third-graders preferred a teacher with whom they could work face to face. One third-grader elaborated, "I liked having the dance teachers come to our school the best. You learn more when they are closer." However, not wanting to lose the possibility of having a VC teacher, he added, "But it is good to have VC teachers, too…. But it is best to have

the teacher right next to you." More interesting were the middle school responses with 40% preferring a VC dance teacher. One seventh-grader shared, "It is a lot like having the dance teacher right here. You just have to be active and participate more. We have to work hard to memorize the steps. With a VC teacher you can't just dance it a little… you have to dance it fully….." Addressing the anonymity that the distance provides, another student stated, "I [felt] more comfortable dancing when the teacher was far away." Another discussed the accessibility found in VC: "When you are face to face, you feel kinda shy…. and it is kinda hard to look in their eyes and talk, but with VC it is easier to talk to the teachers." Several of the older boys who had expressed concern with dancing, believing it to be "a lame activity," ended up our most enthusiastic supporters.

figure 7. Eloy Junior High School students practicing their choreography.

figure 8. Eloy Junior High School conducting circle warm-up activity for dance making.

When interviewed, the classroom teachers described the students following the VC session as:

- More focused;
- Able to retain concepts months after completing the lesson in both science and dance concepts;

- More relaxed;
- Positive and upbeat attitudes;
- Energetic, lively and happier;

VC granted students from Eloy, Arizona access to dance that was previously unavailable. The richness of the medium made it possible for the students to be involved in experiences that extended beyond traditional lectures. VC methods proved functional when presenting choreography and leading dance sharing reflections. For the most part, image quality was good, allowing us to see the students' movements and to provide guidance and feedback. Over the course of the research, Eloy students were able to move three-dimensionally, perform for others, and analyze their own and others' works (figure 9). iDA employed manipulatives (scarves, elastics, fabric, protractors, and games) and technological tools (digital video, PowerPoint, and ELMO), in an effort to create a dynamic learning environment and to address the different learning styles of the students.

figure 9. Third graders presenting their symmetrical shape studies.

figure 10: iDA researchers Megan Fox and Elissa Moriarity at the ASU VC center during an improvisation "jam session".

iDA teaching strategies included working in small groups to support individualized feedback. Visual landmarks, such as tape lines and numbers for spots in the VC room, were used to aid student safety and classroom management. Hand signals guided the students to start and stop dancing, change lines and enter and exit the classroom for performance. Seeing that the seventh and eighth grade students wanted upbeat and physically challenging dances, the teachers added dances that were both physical and creative to the iDA curriculum. We observed how the classroom was energized with the students' hard work. Data revealed that the students remembered individualized attention, with specific comments guiding their dance making. We discovered large group discussions and critiques were best facilitated by the classroom teachers.

In their interviews, the Eloy students addressed the sensations and expressions of movement. One third-grader revealed, "I love dancing and expressing with my body. I like to jump, turn, and wiggle around the room…. making myself big and small. When I dance, I feel free…. like I am flying around the room." A middle school student continued, "When I dance, the music and beat goes inside me and my body is energized. I am so happy. I did not want the class to stop." The younger students were always eager to improvise. When asked whether they felt comfortable performing their dances for VC teachers, 87% said that they did. By creating a less intimidating environment, the students were able to overcome the anxiety one may experience with dance. For others however, overcoming this barrier remained a challenge.

Providing increased access to dance for the students in Eloy was an aspect of the iDA research that worked. Students were able to participate in performances,

critiques, coaching sessions, and even improvisation jams (figure 10). iDA VC fostered a hands-on understanding of the potential of VC and appreciation of how dance can be a mode of expression for students. iDA research shows VC as a viable method for bringing dance education to rural communities.

figure 11. Eloy students express the joy of dancing in iDA.

This paper explores VC as a way for students to access the arts. It has been suggested that university teacher preparation programs could benefit from VC internships and service learning programs. "You can learn a lot from the students, how they are reacting to your instruction. You can judge their tone of voice and their body language. You can see whether they are doing the movement or just marking it. You are able to offer feedback, verbally and visually, and help them embody the movement" said one ASU student.

iDA data concurs with TPL's (2005), positive outlook for VC in the arts. It sheds new light on the use of VC in dance education and its abilities to meet the needs of students in rural communities. We found that VC can offer flexible options to instruction, although glitches and technical limitations may inhibit communication. More research is needed to define and evaluate pedagogical strategies of VC for dance. Further assessment of the iDA curriculum is necessary; additional studies are needed to determine the quality of student responsibility and student learning with VC pedagogy. As VC facilities become an increasing part of our educational infrastructure, the potential for new connections within dance and other arts disciplines will expand to serve the needs of the students.

VC invites students to become active members of a learning community outside their own community and extending into the world. A successful example of iDA's VC instruction involved a dance activity called mirroring. At first the video delay was disturbing and exaggerated, but as I began to dance, I could see that the children were still listening to my directive. I wondered if I had lost them. Then, the students began to move to the music, echoing my movements, expanding, contracting, and shifting from side to side. The students were smiling, focused and intent on matching my movements. The miles between us dissolved, and we were indeed dancing together.

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