Percussion on the Internet
Teaching and Performing in Cyberspace

BY SCOTT DEAL

If you have ever wished for more hours in the day so you could make music *and* surf the Web, then you're in luck. The World Wide Web and music are coming together as never before. This union of music and communication is bringing about a major transformation in music education through online delivery. It is also inspiring the creation of new ensembles and imaginative ways of performing live with other arts media.

The Internet as a musical tool is developing rapidly because it has the power and flexibility to be useful across the spectrum of music. Consider two recent events:

A *New York Times* article described one afternoon when the New World Symphony was rehearsing Steve Reich's "Three Movements for Orchestra" with the composer present, discussing the piece and taking questions. However on this particular day, the orchestra was in Miami Beach and Reich was at Columbia University (Midgette, 2004).

A group of on-stage and remote performers was the highlight of *Cultivating Communities: Dance in the Digital Age*, a production that used interactive audio and video streamed live from six sites around the country to present a showcase of dance and music to an audience at the University of Southern California (Arts Infosheet, 2004).

These are typical examples of the increasing number of activities occurring on the next generation global networks being developed through international partnerships among academia, industry, and government. New communication potrals deploy innovative high-speed applications roughly 800 times faster than the commodity, or public Internet. And a growing number of university music and arts

A scene from *Cultivating Communities: Dance in the Digital Age*. A live dancer at USC performed with images of a fully-articulated avatar animated in real-time by a dancer, in an optical motion tracking system, located at Beckman Institute, University of Illinois in Urbana-Champaign. Dancers: Chih-Chuh Huang (on-stage, Bing Theater) and Cho-Ying Tsai, University of Illinois at Urbana-Champaign (remote).

programs are tapping into this technology. Some of the most prominent institutions, such as the Manhattan School of Music and the Cleveland Institute of Music, are using it regularly to reach many young musicians. In fact, according to Ann Doyle, Internet2 Program Manager for Arts and Humanities (arts.internet2.edu), "Music education has been a highly successful and widely adopted use of Internet2's advanced networks."

Last year I was invited to utilize this high-speed connection in collaboration with *Art on the Grid*, a multi-disciplinary arts group that works on the Access Grid (AG, www.accessgrid.org). The AG is a facet of Internet2 that enables users to interact simultaneously from many different sites worldwide. Where most music education videoconferences are point-to-point, meaning two- or three-way communications, the Access Grid enables multi-conferencing for up to 50 sites. Where point-to-point videoconferences are well-suited for a one-on-one music lesson or a master class involving two locations, the Access Grid is good for a large clinic or master class involving many sites across the world.

With this distinction in mind, two projects using percussion were conceived: an educational clinic and a multi-media performance. We wanted to find out how successful it would be to bring many people together for live musical events, even though separated by thousands of miles. We posed several questions: Can a group of music

students have a meaningful experience on the Grid? At this stage in the technology, what are the shortcomings? What is it like to use the inherent nature of this technology to create original art?

THE GYIL ON THE GRID

Our educational project was the March 2004 presentation of a clinic by Valerie Naranjo. Valerie is the percussionist for the *Saturday Night Live* band and the drum arranger for the Broadway production of *The Lion King*. She is a noted singer and drumming expert in African and Native American musical genres. During her session, she performed on Gyil (an African xylophone, pronounced *jee-lee*) and marimba, sang Native American songs, and lectured about her music. She also directed participants in call-and-response singing. She ended the clinic with a question-and-answer session. There were 26 sites online, spanning Alaska to Manchester, England. Students and faculty from five percussion programs participated: University of Alaska Fairbanks, University of New Mexico, University of South Dakota, University of Maine, and Jackson State University. Other participants included public school students, teachers, and music enthusiasts.

STRETCHING EDUCATION'S REACH

A post-clinic survey revealed tremendous enthusiasm for the overall experience, but as expected for an emerging technology, limitations were exposed, specifically the audio-visual (AV) quality. In this survey, ratings on AV quality ranged from very good to very poor, leading us to conclude that as equipment and technical expertise of operators vary between locations, so do outcomes. Another factor is bandwidth limitations, which affect the quality of the multi-site Access Grid more adversely than in point-to-point conferences, which generally have very good AV quality. However, the situation is expected to improve as experts seek a solution.

Occasional audio challenges notwith-

Saturday Night Live Percussionist Valerie Naranjo demonstrates marimba in an interactive clinic to 26 sites worldwide on the Access Grid Network.

standing, the various forms of Internet-based music performance education show great promise as an augmentation to traditional methods. Christianne Orto, Director of Recording and Distance Learning for the Manhattan School of Music, stresses the importance of this kind of instruction as an enhancement to direct student-teacher contact. She explained how world-renown violinist Pinchas Zukerman, himself an early proponent of distance music education, is able to maintain a close relationship with his students in spite of a busy touring schedule. "Mr. Zukerman is able to double the number of lessons he gives in a school year by using broadband networks such as Internet2."

In addition to teaching enhancement, outreach is another driving force for distance education. The Cleveland Institute of Music (CIM), which has been involved in providing distance learning content in the area of music for seven years, conducted more than 500 interactive

videoconferences last year, mostly to K–12 students in Ohio. One of the conferences offered is titled "Percussion Summit." This interactive videoconference was developed with the assistance of Paul Yancich, Principal Timpanist of the Cleveland Orchestra and CIM faculty member. Percussion Summit presents an overview of traditional and non-traditional percussion instruments and performance practices.

As high-speed bandwidth availability increases, how will online schools develop, and how will they co-exist with their real-world counterparts? According to Mark George, Director of Distance Learning at the Cleveland Institute of Music, future online education will involve "access to great teaching without regard to the barriers of time and distance. In the coming years, students from every corner of the earth and every cultural background will have access to an incredible array of resources in both archived and real-time formats."

Regarding the co-existence of online and on-location learning, Orto states, "There is room for both virtual and real-world music learning. Just as the recording arts have not dampened our society's enthusiasm and interest in attending live concerts and performances, the virtual music studio will only serve to expand and spread the reach of the musical arts learning around the globe."

ACCESS GRID AS A PERFORMANCE SPACE

In addition to using the Access Grid in an educational context, we wanted to see how it could be used as a creative and artistic tool in its own right—in other words, the Internet as a performance medium, commonly referred to as *telematic art*. With this in mind, in April of 2004 *Art on the Grid* presented a multi-media performance titled *InterPlay: Hallucinations*, which utilized performing and visual arts elements from several locations across the United States. Actors performing before a live audience originated at the University of Utah in Salt Lake City. Music and graphics were sent from University of Alaska Fairbanks, and dance and graph-

ics came from University of Maryland College Park.

The live use of graphic, audio, and MIDI software was also a big part of the performances. MAX/MSP & Jitter, an audio-video software system, was used to process video of the dancing and graphics. Music was created with a battery of acoustic drums, MIDI controllers, samplers, processor, and computer. Computer 3D animations moved in tandem with the music through a process of sending MIDI information from Emagic Logic Platinum software and a DrumKAT into Software Touch 101, a graphics program. Utah received all of the audio-video streams, mixed them with the performing actors, and then sent the entire blend of live players and computer creations onto the Access Grid and the commodity Internet.

A VIRTUAL CHALLENGE

The *Interplay* performances were opportunities to exercise the Access Grid's strengths and wrestle with its weaknesses, and in the process learn much about performing in cyberspace[1.] As discussed previously, there were the familiar technical challenges of audio-visual quality and bandwidth, as well as issues of signal coordination and latency. Perhaps the greatest technical challenge to performing live music online is dealing with latency, or the time required for a signal to reach its destination. When music originates at only one site, as was the case in the *Interplay* performance, then other sites can sync up to it easily. When musicians perform together from multiple sites, latency becomes a factor that creates ensemble problems. While there are examples of musicians performing as an ensemble over point-to-point transmissions, a slow tempo or some similar manifestation in the music has made these performances possible. Music requiring great precision and speed between players at different sites is another matter. Even considering the speed of Internet2, there are limitations.

Despite these challenges, the artistic experience of *Interplay* was compelling because of the conceptual enormity of the medium. Like Borges' "Aleph," telematic performances are seemingly ubiquitous[2]. Instead of a physical location that is "somewhere," there is a web address that is "everywhere." Anyone can venture there through a computer,

University of Alaska Fairbanks percussion major Adam Rydlinski plays snare drum while computer programmer Jesse Niles manipulates a virtual mallet instrument in the Discovery Lab, a 3 dimensional, online environment.

and when they do, the minds and senses of real people—performers, audience and community—are there also. In this virtual nexus, ensemble members hail from a spectrum of artistic media and viewpoints. In the past, gamers with avatars (virtual characters manipulated via controller) have most commonly used cyberspace as a training environment for flight, or other kinds of simulation. Now, for artists armed with software, mixers, web cams, 3D environments and other objects in the telematic realm, it is open territory.

ARTISTIC EVOLUTION

The telematic arts and related new media have been developing since the 1940s, and theoretical groundwork for this medium stretches back into the 19th century[3]. It is now developed enough to have many applications that are "friendly" for artists with limited computer expertise. Likewise, as broadband accessibility grows, so does the medium. Because of this, it is interesting to wonder how it will develop in coming generations. For instance, how will telematic art shape musicians who use it

as a performance tool? Perhaps it will further erase the lines between composer, performer, technician and producer. Or perhaps it will bring a broader definition to the term "instrumentalist," so that the essence of certain instrumental families could be distilled into virtual counterparts. In this scenario a cyberpercussionist would be a craftsman of noise, who has mastered a repertory of body gestures that trigger sounds in a 3D environment sophisticated enough that each performer's motions generate unique sound events.

Many other questions remain, not the least being how important will geographic (therefore, cultural) location remain as the Web grows in sophistication and universality? How egalitarian or exclusive will tomorrow's Internet be for emerging musicians and artists? In a medium where the tools evolve on the average of every 18 months, what aesthetic standards will define great works that stand the test of time?

While there are many avenues through which to engage these issues, one new and compelling source is Internet2, as well as emerging ultra

Coaching a jazz ensemble long distance: Manhattan School of Music faculty member Justin DiCioccio works with a student jazz trio at Canada's National Arts Centre thanks to a connection over broadband networks.

high-speed artistic consortiums such as Art on the Grid and, in Europe, the Marcel Network. This next-generation connectivity is proving itself to be prime technology with power to enhance the dynamics of global music education. In time, people anywhere on the planet will have access to almost any educational opportunity they choose. New territory for artistic ventures is also opening up. The availability of hyper-fast bandwidth to a growing spectrum of people has led to the creation of new ensembles and new ways of performing live music with other arts mediums. While the past 150 years has been a historic period of creation and development, a more complete realization of the aesthetics and qualities of telematic art is before us.

ENDNOTES

1. The term *cyberspace* originated with author William Gibson in his 1984 novel *Neuromancer*. The word is used to describe the whole range of information resources available through computer networks. It is related to *Cybernetics*, coined by the famous mathematician Norbert Weiner in 1948. Cybernetics refers to a process of "control and communication between animal and machine."
2. In his short story "The Aleph," Jorges Luis Borges describes the title subject as a point in space that contains all other

points. "I closed my eyes. I opened my eyes—then I saw the Aleph…the only place on earth where all places are seen from every angle, each standing clear…." Though the Aleph is conceptual, it is considered an effective metaphor to describe generations of thought that envisioned, created, and developed the Internet.
3. In 1849, Richard Wagner wrote the essay *The Art-work of the Future*, defining

"*Gesamtkunstwerk*" or total artwork. He envisioned a synthesis of the arts in which opera served as a vehicle for the unification of all the arts into a single medium of expression. His paradigm has clear parallels in the telematic medium. Other composers familiar to percussionists whose works portend the aesthetics of new media include Charles Ives, Karlheinz Stockhausen, and John Cage (who was a major influence for Nam Paik, considered to be the first "cyber artist"), to name a few.

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