

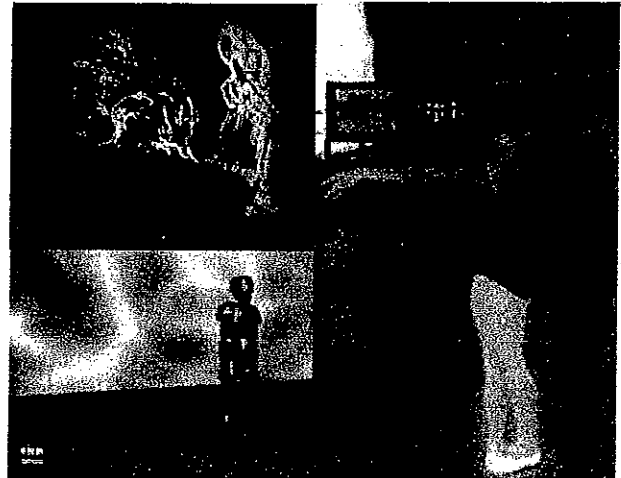


Visual Idea Generation

Computers in Dance Education

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Many choreographers and dance educators have investigated methods for implementing computer technology in their work. Technology presents new ways of creating, instructing, and assessing dance as well as opportunities to expand dance resources and redefine the learning process. Some exciting innovations, include LifeForms animation, networked performances, and distributed choreography that transport dances to new audiences around the world.



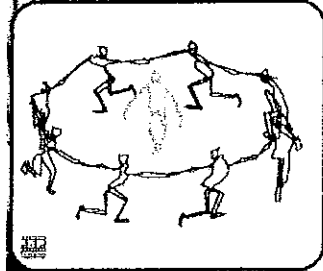
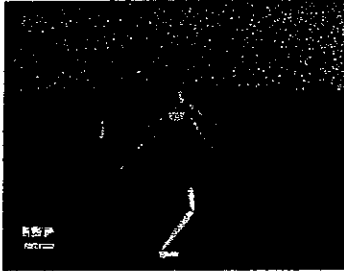
In this Keynote Address I will discuss major themes in the areas of technology for dance education: choreography, dynamic environments, multimedia, and online and distance pedagogy. The earliest explorations in computer animation came from scientists, architects, and choreographers who developed methods allowing computers a voice in the construction and performance of dance. In the late 1960s, Merce Cunningham and Twyla Tharp — choreographers known for their technological investigations, created choreography by experimenting with the concepts of indeterminacy and chance-generated compositional processes. Both choreographers found interesting ways to bring digital technology into their work.

Tharp created the History of Up and Down, using a computer program to make selections from a list of movement elements. The selections offered

unusual juxtapositions of movement, which Tharp used as thematic material for the choreography. Not only were the movement choices generated by the computer, but the stage lighting, was also determined by the computer.

Cunningham further utilized the computer as a choreographic tool in the creation of Trackers. Trackers was created with the assistance of LifeForms, a human animation software. In Trackers, one third of the movement was created using LifeForms on Cunningham's SGI personal computer. LifeForms is a tool for creating and planning human movement in dance and choreography. LifeForms makes it possible to present a three-dimensional virtual

transport dances to new audiences around the world



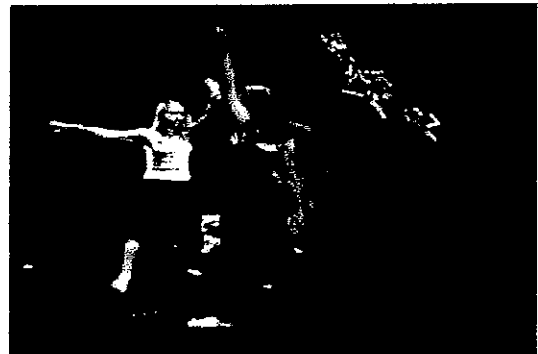
performer (with unique physical abilities) alongside the choreographic organization of creating movements, structuring motifs, and forming choreographic studies. In dance education, LifeForms is widely recognized as the first readily available software for dance educators. It opened up possibilities of dance unbound by the physical body and the forces of gravity. Like Cunningham, enthusiastic educators have found ways to adapt the software to meet the needs and interests of younger students, allowing upper elementary and middle school students make discoveries and express themselves with computer choreography.

Telematics and Distributed Choreography

Telematics is a term created to describe the blending of computers and wireless communication to convey information over a vast number of networks. In simple terms, telematics is a videoconference call that sends and receives information over the Internet. Different from a webcast which is one way. Initial investigations in dance telematics incorporated video and dual site performance



Telematics and the internet allows dancers from different locations to perform for live audiences in real time across time zones. With Internet2 artists began to question the body's relationship to physical sensation and performance. In performance artists, technologists, and scholars explore in telematic space transmitting choreography which can be simultaneously viewed at each location.



Community Connections

The image is Community connections NSF research program to investigate interactive intelligent spaces with High school students. In the research we explored sound and light dynamic environments. I looked at how such environments might change the students relationship to the choreographic choices they made and their understanding of their bodies, their dancing and to the space around them.

In the space there are 16 video cameras, which receive information about how the dancers moves. That information is placed in a computer and then sent back out into the stage to create the images on the scrim and back wall. One of the interesting observations came from the students as they explored creating movement for the projection on the horizontal plane not frontal. It was challenging and moved the students into new physical and choreographic awareness.

Dynamic Environments

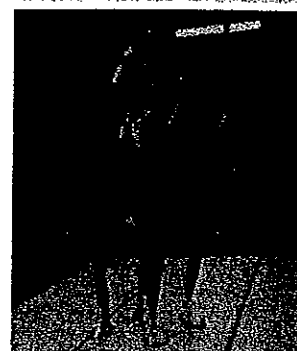
Dynamic performance environments ask us to question traditional relationships of audience and performer, and encourage flexibility and flow as nonlocal, untrained, and virtual participants enter the digital stage. In the 1990s, interactive environments, motion capture and computerized performance spaces became popular, guiding performers in a 'sensory' experience, with their bodies activating various computerized sensors for sound, light, and images. Artists examine dance performance using integrated media technology to create interactive, simultaneous and virtual dance performances.

Responsive Environments

Active Space: Interactive Video dance by John Crawford and Lisa Naugle is an intelligent interactive physical environment that employs a hybrid space utilizing Motion Capture animation, Motion Tracking, real-time computer graphics, and special effects to generate visuals and music. As the mover's actions generate new imagery and enhances the performer's motivation. Visitors can activate, respond to, and ultimately create new relationships with the space. The active space system responds directly to visitors and their motion, creating visuals and sounds that can influence the way people see and move in the space.

Motion Capture and Tracking

Motion Capture and motion tracking are interactive systems that analyze and translate the movement of the human body into digital representations of human movement. Motion Capture is a technique of digitally recording three-dimensional movement of real things. Motion Tracking involves real-time sensing of a mover's speed, duration, and location as part of an interactive motion system. Motion Capture has many advantages over traditional computer animation and is ideal for dance, as it is capable of capturing difficult actions of the body as seen in the layered details of holding props, complex inversions, and partnering. Currently, Motion Capture can cost over \$80,000 for the cameras, lights, computers, software, and the staff to create a Motion Capture studio. The field is advancing quickly and motion capture systems will change dramatically as new and better technology



Merce Cunningham's *Biped* offers an inspiring impression of the field. *Biped*'s a performance work that uses video projections of Motion Capture representations of dancers. *Biped*'s real and virtual dancers form a haunting community. Large, extraordinary dancers soar, settle, and commune with the live dancers, giving the impression of otherworldly dancers moving through evocative spaces. Dance critic Jennifer Dunning describes the digital canvas as having a rare human quality evoked by the towering gleaming digital dancers.

Multimedia

The development of DVDs and high speed Internet allow developers to be able to present related graphic images, sounds, and most importantly, full quality video within the documentation process. Currently DVDs on dance artists and technical dance styles are available and are being developed. Multimedia in dance education supports multimodal student learning. It is possible for a student to learn a dance style, hone their rhythmic performance, and analyze movement elements and phrasing through multimedia technology.

Online and Distance Pedagogy

Internet communication has become an effective medium for the exchange of knowledge and ideas about dance, as it opens the lines of dialogue, bringing contact between artist, student, and teacher. And technology can help build bridges between art forms, and it offers artists and educators expanded options for expressing ideas.

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Interactive Classrooms

Access to a global dance community heightens students' perception of dance in their external environment and broadens their dance community. Eliminating the privileges of geography, the Internet encourages dance students to see beyond themselves and their surroundings and enter dialogues with the world.

iDance Arizona used two-way videoconferencing, over broadband networks, to generate collaborative dance education pedagogy. During the videoconference, preservice university students and rural school students ages 7-15 examined the information, shared improvisation, reflection, and choreographic problem solving. Learning dance by videoconferencing is by no means easy. It requires letting go of old learning modalities and students taking greater responsibility for their learning in dance.

Concern that technology would create social distance is disproved by my research. I observed student participants as more engaged, responsive, vocal, inquisitive, and participatory. Students express a deepened sense of focus and a greater sense of engagement in the learning process with interactive exchange. In fact, most middle school students said that they prefer this method of instruction.

Distance dance ultimately may involve much more than conveying expertise from a handful of experts in cities to disadvantages groups in rural areas. Early experiments suggest that combining videoconferencing with dance could ultimately evolve into a new art form.



Distance Learning and Webcasting

Technology has changed the way students learn, think, form relationships, and the way they express themselves. While there is relatively little published information specific to dance, there is worldwide interest among those in the dance community to design Internet courses. Such virtual education environments restructure interactions teacher-to-student and student-to-student promoting increased collaboration and open discussion that are not found in traditional dance classrooms. Webcasting has become popular instructional modality for dance instruction. A webcast is a one-way transmission live or delayed audio or video broadcast over the Internet.

When designing an online course, the teacher must consider how the learner will control the experience, provide feedback, participate socially with other class members and communicate with the instructor. It is essential to distinguish quality of learning experience vs. mere interactivity. Successful online instruction requires higher-order thinking skills: synthesis, application, and interpretation.

Telecommunication offers great opportunity for dance choreography, instruction, and documentation; furthermore, by removing the social, political, and physical boundaries, online classes have the potential to help form communities in dance. The next section will address some of the implications and challenges when integrating technology into the teaching and learning of dance.

With regard to the dance education profession, technology can offer a bigger picture of what teaching is all about, not only instructing and transmitting knowledge and skills, but evoking within each student what he or she is capable of doing, being, and becoming as a future dance professional.