

Visual Idea Generation: Computers in Dance Education

by Mila Parrish

Keynote Address
at the Dance Research Society of Taiwan
in Taipei Taiwan 2008

Slide 1-Slide 2-
Slide 3

Introduction

In the last 45 years, 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 address, I will discuss major themes in the areas of technology for dance education: choreography, dynamic environments, multimedia, and online and distance pedagogy.

Slide 4

Choreography

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.

Slide 5

LifeForms

Tharp created the History of Up and Down, in which she used 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.

Slide 6
trackers

In 1991, 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.

Slide 7
2
lifeforms
movies

LifeForms is a tool for creating and **planning** human movement in dance and choreography. LifeForms makes it possible to present a three-dimensional virtual performer (with unique physical abilities) alongside the choreographic organization of creating movements, structuring motifs, and forming choreographic studies.

Slide 8
Slide 9
but students
computer
animation

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.

Slide 10

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 the development of Internet2, and teleconferencing artists began to question the body's relationship to physical sensation and performance.

One of the leading researcher teams in dance telematics is the Association of Dance Performance Telematics. ADaPT brings together artists, technologists, and scholars to explore performance in telematic space.

Slide 11
Adapt movie
Video
community connect
Video of

ADaPT partners transmit choreography which can be simultaneously viewed at each location.

Members of ADaPT suggests that with telematics, choreographers can do more with music and graphics to expand dance and other performances.

Community Connections

In this image you see is from a research project called Community connections. I worked with researchers in ADaPT 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 8 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.

Slide 16
Bill T-Jones
Motion
capture
session
Movie

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.

Slide 17

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.

Motion Capture equipment is very expensive. Currently, such systems can cost over \$80,000 for the cameras, lights, computers, software, and staff to create a Motion Capture studio; the field is advancing quickly and motion capture systems will change dramatically as new and better technology and software become available.

Slide 18

Merce Cunninghams' 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.

Slide 19
BIPED image

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.

Slide 20
OSU MDP image
Vicky Uris

Documentation and Preservation

The OSU-MDP is an interactive multimedia dance documentation model. Within their nonlinear multimedia framework, you are able to document the historic, aesthetic, and cultural importance of a choreographer or a choreographic work.

The model served two functions (1) profiling a dance artist and (2) educating others about the field of dance. The first project was on the choreographer Victoria Uris. The Uris CD-ROM, includes multilayered information on Uris' choreographic tradition, cultural background, press clippings, interviews, and reviews of her work.

It presents a branching-linking interface that offers the ability to interconnect multiple media sources. For example, the Labanotation score, musical score, and performance video are all linked to run simultaneously. In it students can cross-reference information on a choreographic work with dance history, movement analysis, Labanotation score, and criticism.

Slide 21
Image of
Labanotation
Labanwriter

Notation, Choreography, and Performance

Labanotation is a codified system for recording human movement developed by Rudolf Laban. Recording dance onto paper in Labanotation is a time-consuming process. A single Labanotation score may take over a year to complete. Technological developments in software have enhanced the writing and reproduction of dance notation.

LabanWriter is a software program designed to record dance in Labanotation. The program includes more than 700 symbols that indicate human movement such as direction, level, body part, type of movement, and duration. The software facilitates fast and consistent notation, providing the notator and the student --ease in recording, editing, copying, and storing their work on a computer.

Slide 22

Laban
Writer

LifeForms and LabanWriter have become the two most widely used software programs in dance notation and choreography. The developers, listening to requests from the field, have developed a translator to run between these two applications. LabanDancer allows Labanotation scores written with LabanWriter to be directly interpreted into three-dimensional human animation. The reverse also works, allowing LabanDancer animations to be translated into LabanWriter Labanotation scores.

Hopefully LabanDancer can successfully inspire students to learn both choreography and notation simultaneously. Therefore, like musicians, students of dance can create and record their dance studies in Labanotation, as they are recording and composing them in LifeForms.

Slide 23
Prey

Prey- Process-Based Dance Documentation

DVD's and the Internet are quickly becoming a preferred method of dance documentation, preservation, and analysis. OSU faculty and Labanotator Valarie Mockabee and I developed a method for capturing and analyzing dance called Process-Based Dance Documentation. Our first project was on a new work created by Bebe Miller called Prey.

Slide 24
Prey
images and
interface
examples

The multimedia examines Miller's choreographic process as she creates a new dance. Mockabee and I participated in all rehearsals videotaping and notating the choreographer decisions and the dancers experiences. We analyzed the work and identified themes and motifs essential to the work.

Slide 25

Goals were to provide an entry into the work informing a director, notator, historian, and teacher about what was experienced and expressed during the rehearsal processes.

And to highlight relationships between the "process" of developing the work and the "product" of the work Videos of these motifs are linked with the Labanotation score. Called Bebe note. It includes historic information, culture, and many activities, which she used to create the dance.

Slide 26

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.

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.

Slide 27
iDance

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.

Slide 28
iDance

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.

Slide 29
Images
from
interactive
gateway

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.

Slide 29
Interactive
gateways

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.

Slide 29

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.

Slide 30

Challenges of Teaching and Learning Dance with Technology

Investment in educational technology is increasing with widespread interest in its ability to facilitate teaching and learning. Yet many issues remain unclear and deserve careful examination.

Professional Development

Computer integration has been mandated on a national level at all age levels and within all subjects. But teachers' readiness in operating computers is a concern. Most of the teachers in today's classrooms have had limited training in technology. Struggling with a lack of professional development opportunities and resources, all educators are working to find appropriate strategies for integration. New initiatives include offering technology workshops at national dance conferences for teachers to learn the tools of technology while earning CPU credits.

Slide 30

Quality Hardware and Software

Outdated hardware and limited computer lab access hinder dance teachers' ability to integrate technology into their curriculum. A strong incentive for computer use in dance is the capability of interactive video and sound. Successful presentation of video and sound require 'state of the art' computer hardware. Without quality hardware, digitized dance video appears choppy and clipped, or it does not play at all. With the proliferation of DVD and online technologies, a need for better computers and fast Internet connectivity has schools working hard to meet the ever-escalating

demands of industry.

Slide 30

Lab Access

Computer lab access remains limited and controversial. Teachers often compete for lab time. A disproportional designation for math and science computer lab allotment is a concern. These subjects often receive priority, making access difficult for dance personnel. Time is a requirement for teachers to integrate technology in meaningful ways. Dance personnel need support from school administrators to reserve substantial and consistent time in the computer lab or to equip their classrooms with a group of computers for students.

Slide 30

Passive Learning

Teachers are concerned that instructional technology in the dance class will create an imbalance between intellectual and physical learning in dance. Educators associate technology with sitting, clicking, observing, and typing. They have an authentic concern that technology will remove the need for kinesthetic experience altogether. Additionally, it must be remembered that videotape does not represent dance, as it flattens the three-dimensional image into a two-dimensional image.

Slide 30

Dance must be experienced in students' own bodies. Teachers are justly apprehensive that with technology, students may view digitized videos of dance, and write reflective essays on dance without physically experiencing anything.

There is just concern that computer-assisted instruction will value a more ordered digital knowledge, thrusting apart the mind and the body, or worse, giving the faulty impression that the need for the body can be extinguished altogether.

Slide 31

Show Lab dance

Professional development

Conclusion

It is unknown how students learning dance may be changed by the integration of technology.

Could they become disinclined toward natural kinesthetic movement? Will dance-technology in education further divide dance students from their physical selves, causing them to lose contact with their bodies? Will it remove the joy of improvisatory expression – of “thinking in the moment?”

In a society that is already distanced from active physical participation and that prefers television, will dance-technology in dance education create a spectator sport?

Might computer-supported dance education encourage teachers who feel uncomfortable with dance or who dislike the creative chaos (and noise) which comes in the dance-making process to conclude that physical expression of dance is inconvenient and therefore unnecessary? Or worse?