

## **DIGITAL IMPROVISATION: INTERACTIVE MULTIMEDIA FOR DANCE EDUCATION**

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This research looks at the complexity of components surrounding multimedia for dance education and sheds light on the issues surrounding the teaching and learning of dance using computer-assisted instruction (CAI) found in the Discover Dance CD-ROM. Case study methodology was used to determine the effects of the Discover Dance CD-ROM on fifth graders' ability to make dances, perform dances, and inquire in the dance domain.

Participants for this research study were 15 fifth-grade students attending a two-week summer dance and technology workshop at The Ohio State University led by the researcher. The students were instructed in dance using the Discover Dance CD-ROM and studio activities for a total of twenty hours, two hours a day for two weeks. Data was collected from multiple sources including student journals, interviews, focus groups, and dance making. In the data collection, emphasis was placed on description and interpretation of the elements rather than measurement and predictions. The students were active co-researchers in this process.

The results of this study reveal information about the issues of learner diversity, knowledge construction, communication, and constructivist approaches to learning. Data reflected that when using the Discover Dance CD-ROM, students were engaged, focused, and intent on learning. The workshop students and outside evaluators characterized the Discover Dance CD-ROM as a valuable resource for self-discovery, choreographic inspiration, understanding and clarifying difficult concepts, useful for outlining and recording their thinking, and encouraging students' active investigation, self-reflection and productive dance thinking.

At the onset of the new millennium, American society is experiencing rapid and profound change, as information traveling at the speed of light transforms the way we live, communicate, form communities, and educate our children and ourselves. In short, we have become an information-rich culture.

National reform efforts have challenged educators to "improve learning by creating interactive, high-performance learning environments" (U.S. Department of

Education, 1998). The department's plan is based on the potential for information technology such as multimedia and telecommunications that can improve learning. Since then, the U.S. Department of Education has required the integration of technology in all subjects, including dance. In the last few years, the majority of dance educators I have spoken to at conferences and workshops in the U.S. and abroad have shown interest in including technology within their curriculum. At the same time, they have complained that they have few, if any, resources to assist them in creating quality dance experiences for their students.

As a dance educator in U.S. public schools for five years, I became aware of the challenges of dance instruction in our schools, limited as it is by time, classroom space, finances, administrative support, or teaching style, among other factors. The integration of instructional technologies can impact the type and kind of dance education delivered. But with what approach and to what purpose? Harrington (1991) cautions, "How technology is incorporated and used may significantly impact what education becomes" (p. 54).

In order to address the application and utilization of technology in the dance curriculum, attention must be placed on the dynamic partnership formed by the student, teacher, and computer technology. Over the last eight years, I have been investigating the use of computer technology in dance education and have developed an interactive, multimedia teaching tool for children, a CD-ROM called Discover Dance, to meet the needs of teachers and students. This CD-ROM was designed to supplement classroom instruction in dance with computer technology. It blends the physical experience of dance (choreography, improvisation, and, performance) with computer technology (digital video, databases, Internet links, and printing capabilities) to enhance students' skills of dance inquiry, analysis, and choreography. The Discover Dance CD-ROM is not limited by style of pedagogy; rather, its focus is to enhance students' experiences and exploration in dance, and expand their understanding of dance.

Especially in dance education, the development of media technologies has remained untapped; and hindered by the lack of meaningful evaluation of technology, educators struggle to meet equivalency requirements as they search for new paradigms in technology education. This CD-ROM fills a void in the field of K-5 dance education, where computer-assisted instruction (CAI) has been nonexistent to date. A definite need exists for meaningful discussion between technology developers, teachers, students, and researchers, and for formative evaluation of the emergent CAI. Students and teachers can test CAI product design in the classroom to see how they match up to their specific curricular needs.

In this article I provide an overview of the research methods employed in testing the Discover Dance CD-ROM and present the analysis of data, conclusions, and recommendations.

### **Statement of the Problem**

The development of media technologies has remained completely untapped in dance education. I have undertaken this research and development of the Discover Dance CD-ROM for children because computer-assisted instruction (CAI) is nonexistent to date in the field of K-5 dance education. In all fields of elementary education, there is a need for technological field-testing and research in "real" classroom environments where

technology is used to enhance learning (Carlson, 1998). In order to improve existing methods for instruction, teachers, researchers, and technology developers can learn from one another to best capitalize on CAI.

Numerous research initiatives propose educational technology as having the potential to meet the needs of our diverse population of students by (1) facilitating diverse teaching practices (Papert, 1980; Budin, 1991; Budin, 1997; Read, 1997; Sandholtz et al., 1997; McGee, 1999); (2) supporting individualized learning (Grey 1989; Mendrinis, 1997; Gore, 1997; Fisher-Stitt, 1994; Sandholtz et al., 1997); (3) fostering new methods of communication (Gore, 1997; Ryder & Hughes, 1997; Trentin, 1996; Margolies, 1991) and (4) providing powerful tools to transform teaching into vivid, student-centered interactive knowledge environments (Resta, 1993; Fisher-Stitt; 1994, Jonassen, 1996; Maletic; 1996, Sandholtz et al., 1997).

Current trends in education reflect the shift away from traditional, linear, highly structured “assembly line” pedagogy toward more active, student-centered, problem-based constructivist pedagogy (Budin, 1997). Constructivists argue that learning is an active process, in which students actively construct knowledge from their experiences in the world. The pedagogy suggests that students don’t get ideas, they make ideas.

Instructional technology has been widely discussed as supporting constructivist teaching practices (Budin, 1997). Such researchers advise moving away from the notion of teachers as the leader, delivering instructions toward the concept of the teacher as a facilitator and coach, and using “flexible strategies for learning” (Budin, 1991, p. 16).

Mendrinis (1997) advocates interactive multimedia technology as supporting individualized learning structures. Widely discussed is the ability of CAI to support the diversity of learners and addressing the needs of multiple populations at the same time. Multimedia technology works to personalize the students’ experience by allowing students to progress at their own pace, providing immediate feedback and personalized instruction.

Instructional technology is fostering new methods of communication (Gore, 1997). Riel (1996) views the Internet and other mediated technologies as dynamic active places that promote meaningful discovery. The Internet is a powerful resource that encourages students to share ideas and acquire information. Computer-mediated communication serves as a great equalizer, allowing students access to anyone, no matter the racial, economic, or geographical distance. Online students are able to form communities as they learn from, share, and consult with one another in a purely digital realm.

Instructional technology and multimedia technologies provide powerful tools to transform teaching into vivid, student-centered, interactive knowledge environments. Further, Baltra (1987) suggests that computers are suitable for the development of “communicative fluency by integrating the four communicative abilities--listening, reading, speaking and writing” (p. 8). Repeatable and patient, CD-ROMs can be viewed at any time and can be adapted to the learning needs of each student. Therefore, interactive video-based CD-ROMS can be used as powerful tools in creating a contextually rich instructional environment for learning. Thus it becomes clear that instruction incorporating technology has the potential to support students in various types of learning that include problem solving, communication, and knowledge construction. Accordingly, these new methods, when thoughtfully applied in the dance education

curriculum, may be capable of adding a new dimension to the teaching and learning of dance.

### **Overview of the Study**

This research study covers the research, development, and testing of the Discover Dance CD-ROM from 1996 to 2000. The study critically analyzes the results of the field test and examines the process of development and design. Case study methodology was used to determine the effects of the Discover Dance CD-ROM on fifth graders' ability to make dances, perform dances, and inquire in the dance domain.

Participants for this research study were 15 fifth-grade students from an elementary school in Columbus, Ohio. The students were instructed in dance using the Discover Dance CD-ROM and studio activities for a total of twenty hours, two hours a day for two weeks. Data was collected from multiple sources including student journals, interviews, focus groups, and dance making. All classes and student interviews were videotaped and selectively transcribed to provide a data record. A non-participant observer was employed to provide a broad representation of the workshop and to corroborate my research notes, observations and evaluations.

### **Research questions**

The following questions served as a foundation that helped guide my analysis. Can a CD-ROM be created that will:

- support the National Standards for Dance Education?
- provide a resource for dance education rich in multiculturalism and the principles of Motif Writing and Laban Movement Analysis?
- enhance the students' ability to inquire about dance, make dance, and share dances?

### **Methodology**

The review of literature for this study indicated a need for further research to address the issues impacting the use of technology in dance education. The current study investigates the design, development and testing of the Discover Dance CD-ROM and made an attempt to determine the effects of the Discover Dance CD-ROM on fifth graders' learning in dance. Qualitative methods were used to collect and analyze data. Attempts were made to identify themes related to participants' experiences and other factors contributing to the integration of dance learning with the Discover Dance CD-ROM.

In the realm of dance education, Riley (1987) rejects traditional quantitative research methods when studying children's dance, because dance [a diverse phenomenon] impacts children's affective, cognitive, and physical domains. Conservative quantitative approaches, Riley believes, have detrimental influence on the phenomenon. He advocates natural and responsive qualitative approaches to studying children's dance, because they are flexible, emergent, and recognize the context-bound meanings in dance. As the researcher, software developer, and instructor in the current study, I matched the qualitative design with the research as well as the researched, since both are intertwined in the data collected and the process itself.

### **Participants/Subjects**

Participants for this research study were 15 students from an elementary school in Columbus, Ohio. The break down of ethnic groups in the workshop was as follows: four African-American and three White non-Hispanic boys; six white non-Hispanic and two African-American girls. Columbus is the Capitol of Ohio and has a population of 670,234. Students study dance from kindergarten through fifth grade with a full-time dance instructor. The school has a student population of 331 students, and a student-to-teacher ratio of 17 to 1.

### **Timeline/Outline**

In preparation for the study, I spent three weeks at the school observing, talking to fifth-grade students, teachers, and their principal, viewing dance classes and performances, and collecting background information on the school community to build a profile on students. Initially, I had planned to conduct the study within the 1999-2000 school year but due to time constraints and the lack of available Macintosh computers and tech support, I decided to conduct my research at The Ohio State University (OSU) over the summer.

During the two-week workshop, students used the Discover Dance CD-ROM and physical dance exploration daily for two hours. The daily lesson content and student needs dictated whether classes began in the studio or the computer lab. Generally, class time was equally divided between the two locations. During the workshop, students worked independently and in small groups improvising, creating choreographic studies, viewing dance movies, answering questions in the CD-ROM, creating annotated dances, and recording their experiences in dance journals.

### **Role of the Researcher**

A qualitative researcher is a storyteller who becomes highly connected to her research participants to establish trust. Trust enables individual participants to feel comfortable and to tell their particular stories. A qualitative researcher becomes a part of the community she is studying. Aware that as the researcher/instructor I assumed a pivotal role in the workshop (guiding, observing, listening, and interacting with students), I was sensitive to the students' needs and interests and made them the highest priority.

Using the constructivist learning model, I became a facilitator or a "coach" rather than the research project director. I was responsible for setting up inquiry projects, securing lab access, and creating the organizational structure for the students to do their work. Within the workshop, the pacing, tempo, and lesson content depended on student interest and abilities. A flexible student-centered inquiry process was useful, as it allowed me to step back and provide assistance to the students.

### **Design Considerations**

The Ohio State University Department of Dance computer lab and a dance studio were used for the test sites. Although initially undesirable, as the OSU test site would entail removing the students from the context of their classroom and school, the OSU site offered several advantages. The OSU site afforded students access to large dance studios with high ceilings, lots of light, walls of mirrors and barres that were unavailable in their school. This contrast is striking because at their school, dance class is held in a cafeteria

and students often complain of sticky floors, due to juice spills at lunchtime. Students commented that these studio were the “real thing,” a place where dancing was the most respected and most highly esteemed experience. Students excitedly peeked in to see what was going on in “real” dance classes and rehearsals. Having professional facilities raised the significance of the research in the students’ eyes, the value of which cannot be underestimated. The OSU facility also offered individual access to high-end Macintosh computers and Internet connectivity unavailable in most Elementary schools today.

### **Procedure for Data Collection**

In the data collection, emphasis was placed on description and interpretation of the elements rather than measurement and predictions. This qualitative research takes into account the wider context in which CAI functions, connecting changes in the learning environment with intellectual experiences of workshop students.

A research strategy was used to examine the Discover Dance CD-ROM: how it operates, how it is influenced by various situations, and what its advantages and disadvantages are. Firstly, I became knowledgeable about the day-to-day activities and ongoing events in the school and with the students.

Secondly, my observation and inquiry became more directed and selective. I focused on selective questions and made inquiries to further familiarize myself with the students and about their methods of using the Discover Dance CD-ROM. This occurred during the two-week workshop.

Thirdly, I began looking for general principles underlying the Discover Dance CD-ROM. Here, I searched for patterns in the causal relationships and in the data analysis section and reported my findings in a broad explanatory context. This occurred upon the conclusion of the workshop.

I relied on multiple methods of data collection: observation, interview, dance making, and, video to gather a broad picture of the issues surrounding the teaching and learning of dance using the Discover Dance CD-ROM.

### **Observation**

Observation was selected as a main method for data collection in this research study, as observation techniques allow for the documentation of human behavior and events as they occur. During the profile building, descriptive observation was used to record the behavior of the students, teachers, and the overall school environment. Then based on my perceptions, hunches, and questions, more selective and focused observations were utilized during the workshop.

Observational data was gathered and recorded from all participants in the study. The students used personal dance journals, the non-participant observer used a notebook, and I used a personal dance diary to reflect and record my daily observations. In addition, the entire workshop was videotaped. Upon conclusion of the workshop, I reviewed all observation materials and developed coding sheets to structure the analysis.

### **Student Journals**

As the Discover Dance CD-ROM was created with fifth-grade students in mind, I thought it appropriate that workshop students become stakeholders and active co-researchers in the data collection process. Janesick (1998) describes this method as

“active learning,” where “power is de-centered and the research process is demystified” (p. 71). With students as research stakeholders, I was able to encourage their feelings of empowerment and participation. Each student in the study was required to be (and honored to become) a co-researcher. In their journal, student researchers were asked to write about their ongoing dance experiences, discuss their own and other students’ choreography, record in-class observation exercises, and discuss their opinions about this method of instruction.

As co-researchers, students enthusiastically took on this role which was somewhere between a participant observer and active researcher. Students valued their journals and the private comments of the instructor, sometimes arriving 20 minutes early to read instructor comments.

### **Instructor/Researcher Diary**

During this study, I kept an ongoing diary of events and experiences in the school. The diary included my verbal comments to the class, concerns, students’ responses, anecdotal conversations with students, parents, teachers, and a record of what happened and when. Further, my diary became an invaluable resource, as it provided a place and time for critical reflection of my assumptions and perceptions during the investigation. This diary became an unexpected resource into the teaching-learning cycle of the workshop.

### **Non-participant observer**

As the instructor and principal researcher in the study, I was immersed in the minute-to-minute teaching responsibilities regarding students’ instruction. Consequently, I had rich personal data, but was unable to personally maintain an awareness of the “big picture” as it unfolded in the classroom. Therefore, a non-participant observer (NPO) was asked to watch and record activity in the classroom. NPO focused on the instructors’ interaction with students, the students’ interactions with one another, and students’ employment of the technology, while noting changes in atmosphere in both the dance and the computer classroom environments.

### **Interviews**

Interviewing was used in this research to reveal as much as possible of the students’ understanding, reasoning, and viewpoint. Interviews were an important component, providing substantive data on the personal perspectives unique to the students being interviewed (Spradley, 1979; Janesick, 1991; Metzler, 1989). The interview structure offered students a chance to explain their answers and to elaborate further, which in turn brought new issues to the surface that had not been considered, predicted, or anticipated. Conscious that the manner and type of question I presented to the students would influence student answers, I employed two interview strategies: semi-structured individual and focus group interviews during the study.

### **Single-subject interviews**

The first interview was semi-structured and occurred during the first three days of the workshop. In the interview, I asked descriptive questions to gather information about the students’ experiences, their perspective on dance education, their interest and

experience in technology, and their everyday lives at school. The second interview that occurred in the last three days of the workshop was more focused. I asked follow-up questions that are directly connected to my research question.

All interviews were videotape recorded and selectively transcribed to establish a data record. Aware that videotape can intimidate and diminish frankness, I worked to build a warm trusting relationship with the students. The students valued the interviews as personal one-to-one time with the instructor. All students wanted to be interviewed. Unfortunately due to the students commitments elsewhere, this was not possible.

### **Focus Groups**

Semi-structured focus group interviews were also used in this research, as they can offer dynamic interactive relationships as students relate to one another. During the focus group process, students interacted with one another taking control, which in turn allowed me to step away from a position of leadership to listen and learn from the students.

In this study, I conducted two focus groups with the entire workshop group. Each took place in the computer lab and lasted approximately thirty minutes. The first focus group occurred at the beginning the workshop and the second focus group occurred at the end of the workshop. Focus groups were a highly effective means of letting me into fifth-grade student culture. Students were enthusiastic and jovial, sharing their thoughts and listening to their peers. As McBride (1998) states, “The language conventions, slang, jargon, and metaphors that characterize conversations... can reveal tacit assumptions, interpersonal relationships and status differentials” (p. 3).

### **Dance Making**

As the focus of this research is the investigation of the Discover Dance CD-ROM as related to student dance making, the students’ expressive body movements while dancing had great importance. To gather this type of data, I employed my skills and training as a Certified Movement Analyst (CMA), to analyze the students’ physicality while in the process of dancing. Laban Movement Analysis (LMA) is used in a variety of research strategies, mainly concerning nonverbal communication or motor behavior. LMA as a research tool has seen limited use because it requires rigorous study and in-depth training to learn the system to attain accuracy of observations. LMA is not recommended as a stand alone research method, but when used in tandem with other methods, it creates a solid foundation that is perfect for dance research (Brennan in Fraleigh & Hanstein et al., 1999).

During the research, I applied LMA frameworks and language to identify, analyze, and record the complex actions expressed through students’ bodies. Specifically, I considered the details of how each student’s body was engaged during computer use, improvisation exercises, and during the creative process. Upon the conclusion of the workshop, I developed coding sheets to record, compare, and analyze students’ expressive physical process while dance making.



## **Methods of Data Analysis**

### **Process of Data Analysis**

In the process of data analysis, I developed coding systems to organize the accumulated data. This coding system has evolved during the data analysis process, as themes and patterns have emerged and developed from the data. To maintain the authenticity of my data interpretation, I have been cautious during the collection, analysis, speculation, and follow-up process to resist jumping to convenient interpretations.

Gathering data through multiple sources (observation, interview, and children's dance making activities) allowed for the triangulation of data. My experience, single-subject interview transcripts, non-participant observer notes, student journals, and the analysis of student process and product of dance making all ensure credibility. After my fieldnotes, journals, and interviews were transcribed and emergent themes identified, coded, and catalogued, I employed an analysis cycle. Using an analysis cycle modeled after Janesick (1998), I began by (1) looking for frequent patterns and empirical assertions in the data. (2) Then I organized exact participant quotations, descriptions, and observations of dancing, computer use, and situational vignettes to support my assertions. (3) Next, I returned to other research sources, journals, background information, and other research in the field (to draw insights from them). (4) I then added "interpretive commentary" as it related to patterns in the data. (5) I then included theoretical discussions relating data to the theories that guided the research study. (6) I then described my role in the research and (7) stated issues that arose during the research (pp. 64-65).

### **Specific Analysis Structures: Observation**

Observation played an important role in this research. My observation diary, personal accounts from student journals, non-participant observers' notes, and daily videotapes were carefully examined for patterns and emergent themes. Specific analysis structures are as follows:

#### Instructor Diary

My observation diary provided a validity criterion and assisted in my sorting out shifts and changes in reasoning and methodological choice. The diary, while reflective in nature, secured a sequence of my thinking and decisions made during the research process.

#### Student Journals

Students' journals became a valuable resource, providing insight into students' understanding of their own experiences. These journals also offered a method to dialogue directly and privately with the students. Following each day's workshop, I collected and read each student's journal. Student journals were selectively transcribed to establish a data record.

#### Non-Participant Observer Notes

As I would be busy guiding and teaching students during the workshop, I chose to employ a non-participant observer (NPO) to assist me in gathering a broader picture of

the workshop. The NPO was not required to use a particular coding sheet to record their observations. Rather, I encouraged observation in several areas. These included:

(1) Transference: The dance making relationships between what is experienced through the technology and in the students; (2) Problem solving strategies: The type and kind of questions the kids ask. Where do the students get stuck? When they get stuck how do they resolve it? (3) Relationships and environment: Is there evidence of the class community changing? How? Evidence of students in showing signs of Boredom, Frustration, Enthusiasm, Excitement; (4) Learner /Teacher behaviors such as: evidence of kids helping or hindering kids to use the technology, or evidence of student autonomy in learning.

### **Individual Student and Focus Group Interviews**

All interviews (individual student and focus group) were selectively transcribed to establish a data record and the relevant information was taken into the data pool.

### **Specific Assessment Structures**

Research in assessment in the arts warns against oversimplification of assessment tasks. Rather, they propose assessment tasks that focus on the holistic aspects of artistic creation including performance, knowledge, understanding, interpretation, and judgement. In addition, complex tasks permit students to assume a more active role in defining their own learning goals and regulating their own learning. Students learn not because they wish to recount their studies on demand, but to comprehend a subject more fully and to seek new information. In this research, three specific assessment structures were implemented. These include (a) Student explorations, (b) “Out of Ohio Dances”, and, (c) Fantastic Dance Documentation.

### **Student Free-Time Explorations**

Students were given daily unstructured free-time when they could explore their own ideas in self-selected ways. This open-ended exploration could have included using the Discover Dance CD-ROM, writing in their journals, or dance making. Students were asked to record in their journals what they did during their free time. Student journal notes were corroborated with detailed description of student free-time explorations. The student explorations were documented in my journal, in the NPO’s notes, as well as on video. At the conclusion of the workshop, these records were gathered and charted. Coding sheets were created to assist in the reflection of what the students did and how they used their time. As the CD-ROM developer, I was interested in matching content with student interest. My analysis focused on several themes:

- Which section of the CD-ROM was most desirable?
- Did choices reflect an interest in exploring unknown sections or reviewing known sections or activities?
- What activities or movies did they view?
- What methods were used to play/view them?
- When did they get stuck? How did they get unstuck?
- How much time did they spend in a particular spot?
- In what ways did they share their experiences with fellow students, with their teacher, and, with the NPO?

### **“Out of Ohio Dances”**

The second assessment activity is called “Out of Ohio Dances.” In this activity, students employed a choreographer’s cycle: to create, notate, record, reconstruct, perform, and analyze a dance. The assessment occurred over 3 workshop days. The point was two-fold: (1) A gauge of the students’ abilities in symbol identification, movement invention, and memorization of individual choreography. (2) A visual, verbal, and written record of students’ thinking when creating and describing their dance. Guiding questions included the following:

- How can we share our dances and choreography with other individuals?
- How can we document a dance?
- Why do we document dance?
- What do other people need to know about a dance?

### **Procedure**

(1) Students created and documented a dance using Motif Writing and descriptive methods. (2) Students performed their dance. (3) Students wrote a short description of their dance reflecting personal importance submitting details on how it could be reconstructed. (4) Written documentation of their dances was collected. Later, a special courier then returned to the class and delivered dances from the students “Outside of Ohio” (their fellow classmates). (5) Students reconstructed and performed from the delivered dance scores. And (6) after each dance was performed, students wrote in their notebooks describing, interpreting, and evaluating each dance, after which, the class discussed them.

The “Out of Ohio Dances” assessment required the students to complete complex and authentic tasks. Assessment criteria included the following: Was the body fully engaged in the process of dance making and dance sharing? Were both students actively participating in the creative collaboration? Did choreography presented reflect innovative original ideas and an understanding of motif writing? When preparing the dance to be sent “Out of Ohio” did the students’ writing include the following? (a) a description of the dance, what the dance is about, (b) why it is meaningful to you, (c) how it was created, (d) a title if there is one, (e) the important dance elements which define the dance, (f) an analysis of your dance. The collected data was analyzed and evaluated using scoring rubrics developed for the assessment task.

### **Fantastic Dance**

The third assessment activity was called “Fantastic Dance.” In this activity, students employed methods of analysis, description, and inquiry on a “Fantastic Dance.” The assessment took approximately 20 minutes and occurred on the eighth day of the workshop. In the assessment the students view a “Fantastic Dance” in the computer and answer questions about that dance on a dance database. The focus of the assessment was twofold: (1) to assess students’ abilities to identify the Elements of Dance (Body, Effort, Space, Shape, and Relationship) to a short dance video and, (2) to assess students’ ability to describe, interpret, and evaluate when asked to describe a dance.

Guiding questions included the following:

- How can we describe a dance?
- What concepts were students able to and unable to identify?

### **Procedure**

On day 8 the students went to the “Fantastic Dance” section of the Discover Dance CD-ROM. The sequence was as follows: (1) students visited the “Fantastic Dance” section of the Discover Dance CD-ROM and looked at several Fantastic Dances; (2) the student chose one Fantastic Dance and answered the five inquiry questions relating to the BESSR dance analysis and the five description questions about the dance; (3) students recorded their comments and saved them on the computer’s hard drive; (4) each student shared his/her observations with the class; (5) the class then viewed the “shared” dance on their own computers and added additional observations. The data collected from the assessment was analyzed and evaluated using scoring rubrics developed for the assessment task.

The following steps have been taken to ensure internal reliability. Integral to the study were multiple researchers. These included students as co-researchers, a non-participant observer, and the use of video recording to provide rich data collection and allow for data triangulation.

### **Data Analysis**

Data from the study consisted of layered qualitative information to provide a vivid description of teaching dance education using the Discover Dance CD-ROM. In this discussion, I will analyze the CD-ROM based on stated goals, and analyze the data, substantiating the effects of the Discover Dance CD-ROM on students’ dance inquiry, dance making, and dance sharing. All participant names have been changed.

### **CD-ROM Evaluated against multiple criteria**

As the literature indicates, the development and evaluation of technology in dance education is highly limited. This study looks at the research, development, and testing of the Discover Dance CD-ROM. Guiding this assessment of the technology were three main questions:

- Does it support the National Standards for Dance Education?
- Does it provide a resource for dance education rich in multiculturalism and the principles of Motif Writing and Laban Movement Analysis?
- Does it enhance the students’ ability to inquire about dance, make dance, and share dances?

In the following section, I consider the second question, providing accounts of classroom observation, student focus group and individual interview comments, and Non-participant observer (NPO) notes and responses during the most recent field testing with twenty-two dance educators at a National Conference in October, 2000.

## **Broad Dance Knowledge**

Multiculturalism, Laban Movement Analysis, and Motif Writing were defined by the researcher as essential components in a student's comprehensive dance education. They were therefore central themes in the development of the Discover Dance CD-ROM. In this discussion, I will present written comments, evaluations, and interviews as a gauge for assessing the Discover Dance CD-ROM's ability to deliver and instruct students in three key themes: Multiculturalism, Laban Movement Analysis, and Motif Writing.

## **Multicultural**

When looking at multicultural learning, two key areas were identified as deficient in the Discover Dance CD-ROM: content and context. In my development of the CD-ROM, I felt I addressed the necessary content by providing a great deal of video and images of cultural dance forms. Going into this field test, I was confident that the CD did support multicultural learning. However, during this analysis I realized that the Discover Dance CD-ROM provided only a cursory glance at the issues of content and context in multicultural dance.

Dance teachers at conferences were often "wowed" by the multicultural content. One teacher wrote: "The CD-ROM would be a valuable tool to bring more of the dance world to my children." Another teacher wrote: "When completed, I will use the CD-ROM as a resource for bringing social and cultural dance forms to my students."

In examining these comments, I believe that the teachers were not addressing the quality of instructional resource that might encourage young dancers to explore dances of other cultures, but were focusing on convenience. The CD-ROM is thoughtfully organized and a handy instrument to deliver multicultural dance video clips which would enhance their teaching. Although I am unable to verify, it seems reasonable to interpret these teachers' comments, as equating the recognition of cultural dance forms with an understanding of cultural dance forms. This observation may reflect the broader field of dance education. The content standard as written, is difficult to attain and with the limited time assigned to dance education classes is seems questionable if the standard is met at all.

A possible benefit for the CD is the use of Web links that can empower the students with the tools to gather both content and context to support their learning multicultural dance education. The CD-ROM does promote a respect for other dance forms, which is directly related to comments made by students in the workshop. One example is Joseph who states, "In the CD I learned about different cultural dances like Chinese dance and African dance." This sentiment is further addressed by Heather who states, "I really like seeing all the dances from other countries." These student comments are in sharp contrast to their detailed comments regarding their experiences using LMA or Motif Writing. The students' simple commentary here relates to their cursory experience in multicultural dance.

The fact remains that in order to learn about a cultural dance, fully introducing the context is imperative. In this research it is clear that the CD-ROM's content is so brief that it does not allow for time to explore the context of a dance. It in fact presents the cultural dance form context-free. Multiculturalism, as an essential component in a student's comprehensive dance education as defined by the researcher, is not promoted in the Discover Dance CD-ROM. It is clear to this researcher that the Discover Dance CD-

ROM, while presenting some resources for Multicultural inquiry and interesting movies, its scope is much too broad to influence true understanding in a cultural dance form. Greater depth is necessary, and this would require a single CD-ROM for an individualized dance form.

### **Laban Movement Analysis**

In the research, development, and testing of the Discover Dance CD-ROM, Laban Movement Analysis was identified as being essential to comprehensive dance education. Prior to testing, the underlying assumption was that the innovative inclusion of LMA would support students' dance investigations and their ability to communicate their thinking in dance.

In their journals and interviews, the workshop students addressed LMA's relevance to dance analysis and creative process. The analysis of data from these journals, interviews, and observations presents two themes evidenced by students' dance making, dance sharing, and dance inquiry as related to their use of LMA in the Discover Dance CD-ROM. The students demonstrated that LMA (1) enhanced their movement investigations and expressive dance action and (2) provided a useful vocabulary for discussion, reflection, and analysis.

### **Enhanced movement investigations**

After two weeks of using LMA vocabulary of Body, Effort, Shape, Space, Relationship (BESSR), the students were clearly building a foundation in a descriptive language used for dance. In their dance journals, students expressed that the LMA vocabulary had become a familiar tool easily applied to their discussion and self-reflection and did in fact change the way they observed movement and created their dances.

The students' final dances clearly demonstrate the investigation of new creative range and territory. In these dances students were exploring combined actions and complexity of actions not previously seen. The analysis revealed a significant expression of range of movement inventions. Furthermore, the use of BESSR concepts of body, space, and shape were highly represented. In conversation, many students directly related their investigations to the use of the BESSR framework in the Discover Dance CD-ROM. One student stated that the BESSR concept of space had influenced his dance expression. William wrote, "the CD-ROM has changed my space--how I use my space, the ways I use my space like levels, directions, and pathways, and the amount of space I use in my dancing. Before the workshop, I did not think of space at all, now I do." In this statement William not only confirms the significance of LMA informing his dance thinking, but he verifies that he has learned what space consists of (level, direction and pathway). This is not a simple task: even many university dance education students would not be able to identify their relationship to space and their use of space.

The LMA framework supported students' expressive physical dance action. Jennifer's dance "Mist" is a good example. In Mist, Jennifer reveals her knowledge of the LMA in her physical movement clarity. Presented below are three separate areas which demonstrate her thoughtful use of LMA in the process of creating and performing her dance Mist: (1) the expressive use of her whole body dancing as related to the length of time and spatial pathway she would travel in (walking, turning and running) as the

mist, or (2) in the range of reach space (the distance described between her arms and head) used to signify that she was transformed and now was a person unable to see where she was going while lost in the mist, and (3) in her strong weight and quick time effort to demonstrate exuberant freedom (leaping and turning) when pushing forward to find her way out of the mist. While analyzing the students' choreography, it became evident that the structures found in LMA did provide a useful system for the students to think in allowing for invention and exploration in the creation of expressive individual dances.

### **A vocabulary for discussion, reflection and analysis.**

The data analysis showed that the students were highly accurate using the LMA vocabulary in the identification of the dominant features in the choreography of professionals and peers. They were able to apply this knowledge to dances which were performed live and which were viewed in the short movies on the CD-ROM. Students were significantly able to identify four (body, space, shape and relationship) of the five elements of dance. It should be noted that effort identification was somewhat difficult for the students to pinpoint. Effort identification requires investigation and practice and is inherently complex and challenging for novices as well as professionals.

As observed by the researcher and concurred by the NPO, the workshop students were able to apply this LMA vocabulary in class discussion among peers, while engaged in collaborative dance making and in interpretation and evaluative activities. The LMA framework was language-like and supported the student with the cognitive power of movement identification. One of the CD-ROM's great strengths was observed as the students' ability to control the playback of movies, which further encouraged the students' identification and descriptive analysis.

In the computer lab, Ryan realized that he was able to play the video clip at a variety of speeds and directions (forward, fast forward, backward, fast backward, and pause). Thrilled at this discovery, Ryan shared this information with the class. Soon, all students were exploring the playback function on the CD-ROM's movie clips. The video recording shows the students completely engaged with the controller bar on the playback feature. Several students began identifying the separate movement actions in a dance and locating the point of initiation of a new movement or body part action.

The NPO describes one such experience in the computer lab: "William and John view a Break Dancer. They play the break dancing guy movie in s l o w motion, going frame by frame isolating different bodyparts. Very methodical, one click and stop, they notice the changes, and another click is followed by pause. Moving very slowly, these boys are completely absorbed. William says about John, "He's so balanced, and so fast!" I walk over and ask William what he is doing and he shows me his analysis process and states, "I'll do it [the frame by frame analysis] again, because it's so fun!" The NPO continues, "they are really analyzing the frame by frame movement of the dance."

While using the CD-ROM, the students are able to practice and acquire the skills of movement identification and analysis. The Discover Dance CD-ROM is effective because the student can use it in practical ways: to go back, review, and view their work again; to choose what they wish to analyze and to write about; and to be able to create, record, and remember their dances. Clearly, the data reflects that the students were able to analyze, identify, remember, repeat, vary, and experiment, using the LMA vocabulary.

Furthermore, the workshop students corroborated these themes and addressed LMA's relevance to movement analysis and the creative investigation. Numerous students wrote of the variety of movements in the Elements of Dance section and how the section informed their choreographic choices. Heather wrote, "You can do so much with just the parts of your body, like wrists, hands, elbows, and knees and be very creative." Another student directly associated LMA in her creative process. Kathy wrote, "I now think of all the aspects of dance when I make a dance: body, space, effort, relationship, and shape."

### **Motif Writing**

As stated in the review of literature, LMA and Motif Writing share the historical lineage of Rudolf Laban. Motif Writing is an integral component of Labanotation, created for identifying, investigating, and recording all forms of human movement from the simplest to the most complex. Motif Writing has been identified by this researcher as being essential to comprehensive dance education due to its flexible interpretation and capacity for developing students' skills of dance composition. The analysis of data revealed two themes as related to Motif Writing. The students demonstrated that Motif Writing (1) facilitates organization, preparation and planning dance compositions; (2) supports organized thinking in dance.

### **Organization, preparation and planning dance composition**

During interviews and discussions, students identified the value of Motif Writing as allowing them to create, organize, and record their dances in writing; to translate dance movement; and to communicate with others about dance irrespective of place and time. Student organization and planning in association with Motif Writing was apparent in all aspects of the class. Many students addressed Motif Writing as a productive compositional tool. A good example occurred in an interview with William who stated, "Motif really helped me use my time effectively because now I can record my dances and read my scores to remember my dances. I don't waste time trying to remember what I did."

The advantages of Motif Writing were recognized in its capacity to enable the dancer to dance in his/her head before physically dancing in his/her body and vice versa. Motif Writing's structured organization and freedom of interpretation aroused the students' faculty to create their own movement inventions and to see more than one way of expressing their ideas. Furthermore, Motif Writing facilitated the investigation of timing, mathematical sequencing (i.e., cannon and accumulation), repetition, as well as the ability to visualize difficult concepts prior to their physical manifestation in the students' final choreography. Clearly, one advantage of Motif's symbol structure and visual representation of movement action is that the students could plan, describe, and organize their thinking. It was also apparent that Motif kept the workshop students grounded so that they could explore and think about their dance.

On several occasions during the workshop, students expressed difficulty collaborating and decision making without first solidifying the movement thinking into the structure of a Mini Dance or a Make a Dance printout. Paul and Joseph's collaborative dance making is a good example of the strength of Motif Writing maintaining a visual representation of the students' dance thinking.



The NPO's notes describe watching these two students in collaboration: "they seem to love the technology and the dancing equally." She continues, "each team is going through different processes. Paul and Joseph work out the movement before they choose the symbols. These boys do a lot of analyzing: "It's stillness at middle level...oh, that's a balance--oh, that's ok, try the low level, hmmm, that's hard to jump from a low level, yeah... that transition is hard. Paul and Joseph begin moving, creating their dance from the scores--the boys really seem to be talking it out, out loud."

Once in the dance studio, the students get to work reading their scores and creating their dances. Paul and Joseph are moving back and forth from the printed score. Having the Motif score seems to help them to make interpretive decisions and to work collaboratively. The "Mini Dance" guides and grounds them. It is a useful tool, affirming the team to remain focused on their task and to spend less time arguing.

### **Supports complex thinking strategies learning in dance.**

In the analysis of data, Motif Writing was identified as supporting the student's thinking processes. With ease and discernment, students were able to translate visual motif symbols into physical action on the first day. As the workshop progressed, the students were evaluated with highly proficient symbol to action transfer as is expressed in their Out of Ohio dance.

When observing the student in the process of dance making and dance sharing discussions, the students were becoming skillful at identifying what worked and what didn't, and where they needed to develop new movement material, to the point that they were maturing as dance thinkers.

The language and symbol identification both expanded the students' ability to analyze and describe a dance, but also worked to create meaningful movement choices. Motif writing builds cognitive associations between the written symbol, reading skill, and physical investigation. As students' dances grew in complexity and length, the dance scores and written notation symbols enhanced the students' ability to remember their dances. In preparation for our dance sharing performances, the students would rush to their dance scores for review so that they would not forget or omit anything while performing. Motif Writing became a manner of communicating and memorizing the students' thoughts and ideas about dance articulately and with rich detail.

Motif was the first aspect of the workshop that students shared with their parents. The students discussed the flexible interpretation of the symbols and the built-in relationship of understanding dance when expressed in reading and writing Motif symbols. They expressed their fulfillment in the command of the language and their ability to communicate and share their ideas with other individuals who had also learned the Motif Writing language. As Lilly addressed the inherent value in learning Motif, "It is important to learn motif symbols to make dances and to read dance scores." This is because the ability to identify, to read, and to write dance changes the way dance is understood.

The student application of Motif Writing was not limited to their thinking as related solely to a dance score but was understood physically in their improvisation and performance. An example of this is during a conversation with Kathy. She addressed the new clarity and intent in her movement due to Motif Writing as she stated, "I now think about what exact movements I'm making as I dance, because of the motif symbols."

Evident were the changes in the student thinking strategies. The CD-ROM made available multiple opportunities to support problem solving and inquiry activities which the students found challenging and educational. When looking at the students' written journals, it became evident that the students went beyond problem solving to the implementation of Motif Writing as meaningful personal expression. It is further concluded that the use of technology as seen in the CD-ROM reinforced the students' verbal skills and writing abilities, while building associations between the written Motif symbol and creative process.

This evaluation presents three essential components in a student's comprehensive dance education as defined by the researcher, which were central themes in the development of the Discover Dance CD-ROM. Two of these three themes grant strong support in the CD-ROM, while one falls short. In this field test, the CD-ROM provides only a cursory informational overview of the intended component of multicultural dance education, while it provides convincing support of the components of Motif Writing and Laban Movement Analysis.

### **Summary of the Findings**

In this research study, I learned that interactive multimedia in the Discover Dance CD-ROM shapes what students learn and creates an environment for the students to organize, refine, and reflect on what they learn. The following is a summary of my findings.

The Discover Dance CD-ROM is an engaging and successful tool for fifth-grade students to learn about dance. The CD-ROM strongly supports four of the Content Standards as defined by the National Standards for Dance Education. In this analysis, four standards were identified as correlating directly to the CD-ROM: (1) the identification of the elements of dance; (2) choreographic processes; (3) communicate meaning; and (4) critical thinking skills. The remaining three National Dance Content Standards, (5) understanding cultural dance; (6) healthy living; and (7) making connections to dance and other disciplines, were identified as not correlating to the CD-ROM.

Multiculturalism, Laban Movement Analysis, and Motif Writing were defined by the researcher as essential components in a student's comprehensive dance education. Two of these three themes were strongly supported in the CD-ROM. While the CD provides convincing support of the components of Motif Writing and Laban Movement Analysis, it provides only a cursory glance at the intended component of multicultural dance education.

When using the Discover Dance CD-ROM, students were "constantly engaged," "focused," and intent on learning. Individual and collaborative activities encouraged the student toward complex inquiry, goal setting and self-evaluation. Students' energy and enthusiasm was apparent at all phases of the workshop, extended beyond the workshop, and continued in their homes. Described as "packed to the max," the students characterized the CD-ROM as a valuable and useful resource for self-discovery, choreographic inspiration, understanding and clarifying difficult concepts, and for outlining and recording their thinking. Students also appreciated the CD-ROM for its large reserve of interesting dance movies and websites for active investigation and as a valued spot for self-reflection and productive dance thinking. One student comments that

with the CD-ROM, “you can see more varieties of dances in the computer, and you can find more ideas.” Vivid description of student dance making points directly to their construction of dance knowledge in the CD-ROM.

Students, evaluators and the NPO concurred on the range and breadth of dance content in the CD-ROM. Their descriptive comments and observations focused on the comprehensive LMA framework in the “Elements of Dance” section, and the interactive and layered use of Motif Writing throughout the CD-ROM.

The students expressed that Motif Writing was highly effective in enhancing their ability to organize, create, evaluate and reflect on their own and others’ dances. One student articulately described the valuable Laban language and vocabulary for communicating, remembering and creating the meaning of his dance. “Motif helped me the most because you can make dances in your mind before you put them in your body.”

Using the computer, the students were able to conceptualize, formulate and expand on their ideas. The students were fluidly able to transition from dancing to playing the CD-ROM to dancing again. As a result of the workshop activities and CD-ROM representation of all types of people dancing, the students identified their own role in the broad picture of dance.

Students exercised their knowledge in the LMA frameworks, Motif Writing and the other activities in the CD-ROM in their dance making, dance sharing, performance and reflective self-evaluation. Discussing the “Fantastic Dance” section of the CD-ROM, the NPO comments, “this activity ... show[s] that they are really getting this material, but then at a certain point it's just the tiniest bit beyond them, over their heads. Perhaps a perfect challenge!” While the material was rigorous and challenging, students ardently focused making connections to their choreography, creating dance scores and journal entries.

The interface, movies, interactive tasks, (even those created for students assessment) support a sense of learning as a game-like activity. Investigations and time to “mess around” on the computer were described by the students as inspiring and stimulating.

Self-navigation and student-directed controls were essential features necessary for the students to take charge of their own learning. As a result of the employment of multiple methods for viewing and interacting with the CD-ROM, students developed the skills for descriptive analysis.

The CD-ROM changed the way in which these students came to know about dance. Students described their experience using the CD-ROM as a journey and as an improvisation, where they could uncover, discover, consider, and follow their interests where they wanted when they wanted. Students were able to follow their interests, direct their investigation, and were able to learn what they felt they needed to learn. This work in multimedia technology for dance education is still in its early stages. I hope others will begin to think critically about the integration of technology in dance education. Future research can draw from these results to help expand both the development of new media technologies and the integration of interactive CAI into teaching and learning in dance education.

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