

CONSIDERING THE ROLE OF TECHNOLOGY INTEGRATED DANCE CURRICULUM IN POST-SECONDARY EDUCATION

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Just under four years ago, while studying dance as an undergraduate student at the University of California, Riverside, I experienced a broad introduction to dance and technology through dance for film, media, gaming technologies and cinema. Analyzing and evaluating technology's relationship to dance through my media and cultural studies curricula taken in tandem with dance coursework gave me unique perspective on this topic. Fueled by the exciting possibilities at the intersection of dance and technology, I left my undergraduate program with a hunger to discover more. Just two short years ago, I began a deeper journey of research within dance and technology for my graduate studies at Mills College.

Over the course of my inquiry into this broad and somewhat debated topic, I was many times met with opposition, unfamiliarity, and frustration. It was this resistance that fueled my research to find understanding and make meaning about this topic for myself. First-hand experience with several forms of technology in parallel with my research for this paper created an immersive experience that formed a lens of both scholarship and personal practice from which I write. Throughout this investigation of dance and technology, I have observed, participated in, and uncovered evidence-based research that supports integrated technology curriculum. Additionally, my personal journey to

investigate integrated technology at the post-secondary level has created knowledge of resources necessary to support and develop a positive relationship with dance and technology.

Prevalent at the juncture of dance and technology is a lack of understanding of the implications for dance. For a clear characterization of the field of technology and dance, it is critical to define this in a contemporary context. The category of dance and technology is broad, and although not an exhaustive list, it can include dance for film, interactive performances, video, projection for performance, live video feed, software, hardware, or other electronic means that enable, enhance or define a performance. For the purposes of this paper, technology for dance in post-secondary education will include computer hardware, dance related software, the Internet, cameras, projectors, supplemental videos, audio recordings, and course required viewings.

My graduate coursework at Mills College offered elective coursework in dance for camera, and live media and performance using Isadora software, the latter in which I was a teaching assistant. On my own initiative, I sought out individual mentorship through independent study with the Microsoft Kinect camera—a gaming technology device. While my understanding of these types of performance technologies is unique, it is not my intention to argue that these technologies are necessary. My research supports a basic understanding of technology as tool in the studio and classroom, and will evidence that it is more important to match outcomes for directed learning, rather than focus on specific technology.

While the field of dance and technology is constantly being re-defined, this research will focus on the current state of post-secondary dance—from a historical and

contextualized vantage point—and will support the immediate need for positive adoption, integration, and outcomes within classroom and studio environments. I investigate technology integrated dance curriculum using case studies, personal interviews, and evidence-based research about the way technology can revitalize and more importantly, financially fortify dance in post-secondary education.

Most readers of this paper will have experienced interacting with digital technology in some way. Whether email, web page, or by simply using a smart phone, the modern world is immersed in digital technology. Digital technologies, especially the Internet, have emphatically changed the face of identity, community, relationships and more over the course of the last several years. Brown (2011) summarizes that technology has also changed the way in which we live, love, and separate as individuals as well as a society.

Van Dyke (2012), an educator, scholar, and dance artist, questions the current state of university dance programs, expressing fears about the need for validation, economic viability, future educators' training, and specific foci of dance departments. Certainly the crux of the article is her concerns about the foreseeable future for university dance programs. My own concerns about the relationship to dance and technology were uncovered while in my graduate studies. While this brought its own unique opportunities and challenges, it also provided a platform from which to research the specifics of this topic. As a field, it is vital to take meticulous consideration of the current course set for dance at the post-secondary level, and to be cognizant of choices being made in the present that will influence the future for the next generations of dancers and dance educators.

Growing concerns about the focus of dance programs, graduate study opportunities, and funding are current, yet continuing problems. Risner, PhD, of Wayne State University (WSU), expresses his immediate fears at the dwindling numbers of terminal degree programs in dance. He states, “without strong and accessible graduate study opportunities, the profession cannot sustain itself” (p. 107). In his search for answers, Risner strongly supports technological integration as part of a solution. It is imperative to recognize that integrated technology training can enrich dance by deepening and enlivening artistic expression as well as providing academic empowerment.

In university dance programs, varying degrees of integration with technology are emerging. Leijen, Lam, Wildschut, Simons, and Admiraal (2009) of the Netherlands analyzed data from streaming online video in two separate classes, while WSU features a comprehensively integrated technology program. There are other programs that highlight technology as an emphasis, but in this paper, I focus on WSU because of its required integration of technology into the core curriculum. WSU requires their BFA dance majors be enrolled in five courses of dance and technology training throughout their four-year undergraduate program, and produce an e-portfolio in their senior year. From their research, Risner and Anderson (2008) state:

The pedagogical model for DDL (Digital Dance Literacy project) coursework combines demonstration, in-class and online tutorials, hands-on independent work, and collaborative group work. For software instruction in the DMC (Dance Media Center), students work on their own dedicated computers, working individually or in

pairs, while the teacher demonstrates software principles and applications from a teaching station with large projection capabilities. (p. 117)

In the case of WSU, significant improvement has been realized in the areas of choreographic research, student research achievement, and funding.

With funding that was already in place when he assumed an administrative position at WSU in 2003, Doug Risner had the unique opportunity to create the DDL (Digital Dance Literacy) curriculum using his background in education and the input of faculty, staff, administration, and students. This funding was used to update the dance facilities at WSU including the establishment of the Dance Media Center (DMC) housing just over twenty Macintosh computer stations. The department also provides digital video cameras, projection space for lectures, and a resource library in support of the curriculum. These resources—computers, cameras and projectors—are likely available in many, if not most dance departments. While not every university has the resources to immediately introduce a comprehensively integrated curriculum, my examples show methods that educators can begin to use to incorporate technology as a tool in the classroom.

Dance students entering a university program in the United States are typically proficient at most forms of current classroom technology. Risner and Anderson (2008) indicate that in secondary dance education, technology competencies are often required in high school by many states. This highlights the fact that there are unfulfilled expectations of incoming students in a dance department without technology integration. A dance department ignoring this adeptness with technology is eliminating a powerful tool for choreography, performance, and feedback.

Mitchell of Arizona State University (ASU) reflects the strong, immediate necessity of technological training for incoming dance students. He states, “The students today, the ‘born digitals’, use technology as birthright. There is no need to introduce it like in the pre-born digital day” (Mitchell, personal communication, October 16, 2012). Mitchell has noticed an increase of interest in dance and technology courses. He attributes this to the recent modernization of dance courses to include more technology, and to the fact that the ‘born digitals’ are coming into the post-secondary environment with technology skills already in their grasp.

Leijen et al. (2009) of Utrecht University in the Netherlands analyzed a streaming video environment to enhance reflection, self-evaluation, physical description, analysis and feedback in both dance choreography and ballet technique. This study found that the streaming video environment was extremely effective at enhancing reflective thinking and refining description and analysis. The required viewing of online video taken in-class is an example of a methodology using integrated technology to support specific outcomes.

Looking closely at Risner and Anderson (2008), Leijen, et al. (2009) and others, it is clear a sustainable approach to revitalize dance education in universities can be accomplished through the use of integrated technology. Moreover, looking at present examples of evidence-based research about technology pedagogies, it is argued that this is an economically and pedagogically sound way of enriching current practices.

Part 1 - Dance and Technology, a Brief Introduction to Practical Use in the Classroom

The intersection of dance and technology is far from new. It has been part of dance culture since Loie Fuller created colored gels for stage lighting and used fluorescent salts to make her fabrics glow. Subsequently, dance has often been at the forefront of technological advancement. Birringer (2004), an independent media choreographer, calls dance an "absorbing technology" (p. 167) that is constantly pushing the boundaries of performance and performance art.

Risner and Anderson (2008) look for ways of teaching with dance technology that reinforce creativity, maintain the discipline of dance, and center around the moving body. The first graduates of the program at WSU were in their senior year when findings were published. The four-year, five-class undergraduate program at WSU culminates in a digital portfolio that is the capstone for the senior dance students. WSU's methods for the DDL program were to integrate technology in required (*rather than optional*), undergraduate dance curriculum, to focus on student-centered design and relevance, to balance content in creative and practical aspects, and to complete an electronic portfolio in the senior year.

WSU's DDL curriculum uses constructivist pedagogy, and the core curriculum doesn't supplement technology, but rather ties technology into existing core courses in the BS and BFA curriculum. The program confronts many issues dancers face by seamlessly imbedding advanced technologies into coursework throughout the undergraduate degree. Additionally, the results of the DDL program were published from a faculty, student, and administrator perspective, providing insight for what

processes worked, what needed improvement, and how and why technology integration helped dance students in practical application.

Anderson and Risner's (2008) findings at WSU's commence using student researchers and several faculty research mentors. Year one incorporates a course of *Music and Dance Relationships* integrating sound and video through use of Audacity and iMovie. Year two's course of *Issues and Trends in Contemporary Dance* looks at technology applications in terms of current trends and uses iMovie to create dance works. Year three's course is *Dance Production* which covers typical dance production elements, but also incorporates Adobe Photoshop for creating press materials. Year four has two courses, *Choreography III* and *Senior Capstone* in which they create their digital portfolio using Final Cut Pro and DVD Studio Pro to showcase the culmination of their previous years' work and finalize their artistic statement through publication of their e-portfolio (pp. 117-119).

Since the 2008 publication, Risner has noticed significant change in students regarding accessibility to the Internet, computer literacy, and overall technological fluency. In online courses, introduced shortly after the 2007 findings, he initially found five or ten students struggling with the practical technology. As of 2013, he sees one or two students experiencing any difficulty at all (Doug Risner, personal communication, March 15, 2013). This indicates significant improvement regarding computer literacy, access to the Internet, and overall electronic adeptness.

While tools of technology (computers, digital cameras, projectors) are typically available in most dance departments, the use of them for a tool in learning is often absent. In my personal experience, it is unlikely that a technique instructor will have the

familiarity to power up and connect a projector for use, regardless of the equipment's availability. In fact, throughout my research on this topic, I generally found that technologies for teaching were often in place significantly sooner than faculty, staff or administration were trained in the use of them. In this regard, many dance departments are fully equipped to instruct with and through technology, but actual implementation is often missing.

Prior to installing the DMC and implementing the DDL Program, WSU's primary focus was dance choreography, but no recognition or achievements in choreography were of noted success at that time. Not until after the DDL program was introduced did they see regional and national recognition for their choreography at ACDFFA (American College Dance Festival Association). Doug Risner points out that since 2008, nine students have been awarded at the regional level at ACDFFA, and five have been honored at the national level (Doug Risner, personal communication, March 15, 2013).

More significantly, student research achievement has improved. After the DDL program's inception, eleven student research projects have received research grants from the university, and three were presented with the prestigious Academy of Scholars Outstanding Research Award—a university wide competitive research grant opportunity. These three students also presented their research at the National Conference on Undergraduate Research and at the National Dance Education Organization (NDEO). Risner states, "Our integrated technology curriculum has changed this (choreographic recognition and student achievement) and significantly impacted student research and grant funding (Doug Risner, personal communication, March 15, 2013)." Risner notes that not all of these achievements can be attributed to

the DDL curriculum, but clarifies that every single research grant awarded implemented technology in some way. This fact indicates a direct connection to funding and integrated technology in dance. For any dance department considering integrated technology for their dance program, this fact is cannot be ignored.

Faculty, staff, and administration were all recruited for implementing the WSU curriculum (Doug Risner. Personal communication. March 15, 2013.). Risner remarks that although his technological skills have significantly improved, his primary role remains supervisory. Additionally, he admonishes that the educator's role in integrated technology curriculum is one of guidance and facilitation rather than mastery of a specific skill. Risner calls this a "co-constructivist" approach. He indicates that his students have demonstrated capabilities far beyond what instruction in any specific technology could generate. He feels that students are able to take the technology "much farther" on their own with only the advice and direction from faculty (Doug Risner, personal communication, March 15, 2013).

A dance program considering technology integration must be aware of this important distinction. While traditional education methodologies find the role of the instructor to be that of an expert, in technology education this role will primarily be one of guidance and facilitation. Risner's experience indicates that an expert in technology is not fundamental as part of a program that is considering implementing technology.

Part 2 – The Appended Subject: Theorizing a Moving Technological Body

While technology is a broad field, it is important to understand the technological from a cultural and theoretical perspective. In this brief theoretical foray, I seek to give both an introduction to the subject of dance and technology, and also to introduce the

idea of agency in technology. Gibson's (1984) science fiction novel, *Neuromancer*, prophesied the Internet, planting the idea that technology would eventually become the ultimate in transcendence—that one day, man could ascend “above” the physical bodies and enter the realm of the technological completely. These concepts introduced in *Neuromancer* caused a desire for physical assimilation with technology to become a popular topic of science fiction novels, film, artists, and media—eventually leading to the self-fulfilling prophesy of the Internet.

Important to remember about many early theorists who speculated about technology is that they saw the potential for challenging human subjectivity. In many ways, this is probably the most productive way of viewing the mediated space created by technology. Although not as liberatory as once thought in destroying cultural or socially inscribed identity, technologies, including the Internet, do contest and reconfigure the way in which we view each other and ourselves. Technology provides a place where there exists agency to resist forms of cultural production that are constructed within reality (Hayles, 1999).

Lauren Cruikshank (2001), a contemporary theorist who writes about disembodiment, holds that the wonder of cyberspace provides the ultimate reconfigured embodiment of the physical to a universal consciousness of sorts combining the minds of many—free from the physical constraints of the body. In her attempt to explain the desire for this theorized dis-embodiment or the melding of body with machine, she likened this desire to the inherent otherworldliness associated with leaving the physical body behind, and entering the ultimate state of consciousness. Cruikshank’s article primarily speaks about the disembodiment that accompanies participating in an online

role-playing game, otherwise known as Massive Multiple Online Role Playing Games (MMORPG). Cruikshank participates in and writes about her experiences as her digital self is embodied online as an avatar in one of these games.

While video games are considered a disembodied experience, many forms of digital media are parallel in their displacement of bodily identity. Text, video, or live feed performance for dance is full of social and cultural production. We create, recreate, and interpret meaning from gesture, clothing, framing, lighting, sound and movement. Arnold (2002) finds that media becomes the vehicle upon which we fracture our bodies in a transitory position, providing an 'aspect' from which to view ourselves as subjects, and also see the 'other' that has been created. Not from societal constructs, but from our own bodies.

Gonzalez (2003), a prolific writer on contemporary art with an emphasis on installation art, digital art and activist art, uncovers that as text creates a way for us to encode and decode social and cultural meaning, so technology and its relationship to the self, the body, and our identity removes and reconfigures the body's subjectivities thus creating a digital appendage to the physical. When considering technology as a digital appendage, the implications for dance are powerful.

For dance, conceptualizing a piece of technology as an appendage generates exciting possibilities. Deriving choreography through use of a third arm or leg that is projected onto the body constructs numerous opportunities for dance. One artist who delves into these technologies is the artist known as Stelarc. He explores the possibilities of superfluous appendages, technologically fashioned shells of bodies, and bodily enhancements in this work. In some sense, this is a type of bodily co-presence.

The body is in one place, yet another part of the body is projected, created, and sometimes re-created in another.

Gonzales (2003) articulates a clear definition of a bodily co-presence or digital appendage. Focusing on the body's representation, her explanation of the appended subject states,

The appended subject describes an object constituted by electronic elements serving as a psychic or bodily appendage, an artificial subjective that is attached to a supposed original or unitary being, an online persona understood as somehow appended to a real person who insides elsewhere, in front of a keyboard. (p. 299)

It is in this way that text, video, or other digital performance becomes a type of agency.

Simple forms of this can be seen through a bank's online bill pay, the IRS tax records of a single person, or an employer's record of their employees. The users corporation, bank or employer identity can act independent of the presence of the human to whom it belongs. When a person schedules a payment online, and it is paid to the payee without the physical presence of the person who sent it, this is a type of co-presence. Arnold (2002) states that this co-presence becomes agent to the body behind the glass screen. Although not a physical body, the online identities or 'avatars' that are created are fully capable of making decisions, inhabiting, working, playing, and to various degrees, living online.

Internet performance and its inherent displacement of the physical body provide exponential growth of embodied interactivity through which the self is projected, expanded, and multiplied. Virtual space via the Internet as performance for dance

implies a non-physical, yet sensory experience of movement through a virtual environment composed of networks, relayed and sometimes delayed connections, software and hardware that creates, multiplies, and broadcasts a plethora of performance and viewing opportunities. For a dancer, this extends choreographic possibilities, and can digitally support the communicative properties of their work without extending the physical body.

Whereas the proscenium stage traditionally places the performer as object, Hayles (1999) indicates that the dancer's body being broadcast into or with technology challenges and alters the aesthetics of spectacle and cultural object. Rather than audience, sound score, or live performers, technology for dance is able to replace these elements with the eye of the camera, the speakers of the computer, and the screen imagery viewed in time that is temporally and spatially indefinable.

With sites such as YouTube, Steal This Dance, Ustream and others, viewing and performing dance online is no longer a trend; instead, it is a common practice. At the forefront of this environment are the techniques of machine and the intersection of movement with technology that complicate the human aspect. Van Dyke (2012) indicates that this intersection of dance and technology provides choreography of potentiality for interaction that is fractured, changeable, and unpredictable.

While technology creates, shapes, and defines the spaces around life in the twenty-first century, for dancers, choreographers, and practitioners of dance, the exciting possibilities of manipulating space, time, and energy are exponentially significant. In my own experience I have found that while posing its own complications and complexities that are certainly challenging, the opportunities that technology offers

far outweigh the obstacles. This technological environment must be enlisted as a mechanism by which dance, as a field, is propelled and informed. In the next section, I pose several examples that provide evidence-based research to support implementation of integrated technology in the post-secondary environment.

Part 3 – Current Technological Integration:

Detailed Examples and Implementations

According to Anderson and Risner (2008), several university dance programs in the United States offer at least one dance course in technology. Commonly, this course is delivered in the form of a one-term, general overview course. This is typically an elective, but in the instance where it is a requirement, it usually materializes in a graduate degree program. In the following examples, perspective, understanding, experimentation, and analysis are proven to occur while concurrently building technique using integrated technology. Also, examples with social media and multimedia learning theory highlight technology's capability to support learning.

Leijen, et al. (2009) studied a streaming video environment's ability to support description, evaluation, and relation of multiple perspectives in ballet technique and choreography classes. The format for this reflective practice went as follows:

DiViDU was used to conduct the reflection assignments. DiViDU is a video-based learning environment developed for learning tasks based on authentic practical situations; it covers three learning processes: learning to analyse authentic situations, learning to reflect on these situations, and learning to demonstrate acquired competences. (pp. 171-172)

From viewing the video taken in class and posted online, students supplemented self-correction in the ballet technique class. In both ballet and choreography, video was found to be exceptionally useful in terms of self-evaluation. Reflexive thinking from multiple perspectives was demonstrated by the students' perception and feedback of both their own and their peers' dancing.

All students involved in this research felt that the online environment was a safe place to provide feedback. Because the feedback was shared over the Internet via text, the students felt that they were able to give and receive objective feedback directly related to the material. At the end of the study, researchers drew positive conclusions about peer feedback when supervised by an instructor guiding them with specific assignments. This study closely aligned outcomes with the technology implemented in the classrooms. Through focusing their particular study on outcomes of enhancing reflective thinking, peer feedback, and technique improvement, the study was successful.

Sharpening in on the media craze of popular, competitive dance television shows, Harding (2012), a high school dance teacher from Perpich Center for Arts, has developed a method of assessment, feedback, and transparency from cultural and historical perspectives. Her method engages the students by watching television clips in class at the beginning of the year. Harding asks her students to explain what is important about each one and why. As they continue to view and discuss these clips, Harding guides the class to recognize their own perspectives and personal histories. Through this dialogue of assessing and paring away the value systems of the judges, themselves, and the class—both intrinsically and extrinsically visible—Harding builds a

clear and mutually understood assessment criterion. Additionally, Harding shows the class video clips of diverse genres of dance that facilitate a discourse from historical and cultural perspectives. This transparency is maintained throughout the course providing a foundation of mutual understanding and expectations. In this way, popular television and culturally specific video footage is used for creating assessment criteria based on cultural, historical, and personal perspective.

Similar studies have investigated alternative forms of media to evaluate pedagogies incorporating technology. Social media, the Internet, and digital communication are a sizeable part of incoming students' lives. Sanchez-Franco, Villarejo-Ramos, and Martin-Velicia's (2011) show that collaboration within the classroom is not sufficient, and that social networking can influence and supplement class assignments. Considering Facebook as a learning tool for impact on integration with learning, Sanchez-Franco et al. (2011) measured learning performance through post-adoption usage (student's inclination to continue to use these methods after initial testing period) as the causal factor in determining this. They found that community participation and organization via Facebook had major impact on integration and class participation. Use of Facebook was a convincing tool of engagement for the students both inside and outside of the classroom environment. This same study found that community integration showed minor influence on post-adoption usage, and the most substantial influence on learning performance was represented through the post-adoption usage itself (pp. 260-261). The students' continued use of Facebook, after the course was completed, had positive impact on students' long term learning potential.

Supporting the idea of technology as tool in motor skills learning, the research team of Dania, Hatziharistos and Koutsouba (2011) used modern theories of multimedia learning to confirm that movement should be taught using multimedia tools. In their findings, they state:

Through the prism of the modern theories of multimedia learning, digital multimedia can function as a means of concurrent activation of the visual and verbal system of receiving and processing incoming information. In this way they set up an attractive learning environment suitable for the modulation and embedding of the motor schemata that are necessary for movement performance. The present literature review did not find any recently published research that used the principles of such a theory as guidelines for the development of interactive software. (p. 3359)

These findings are supportive of technology as tool, and not content. Additionally, this research found that technology in the classroom should be used in knowledge construction rather than means of knowledge communication.

My undergraduate experience utilized Facebook as a tool for class assignments incorporating community participation and group organization. Additionally, my peers and I created a digital archive via a website documenting decades of performances for a dance professor as part of a final project. These two examples were only a few of the tasks that I was given as an undergraduate, which primed my technological skill set upon entering my graduate degree program. Dance programs at the university level who choose not to engage student learning through mediums such as Facebook, digital archives and others are dismissing the potential for innovation within dance education.

Part 4 – Co-Constructing a Future

At this juncture it is critical to understand the connection that dance and technology projects have to funding. Dance technology is a way to fund new and innovative work, and, as seen in the grant opportunities afforded the students at WSU, can certainly be fundamental to attracting economic support. Structuring a dance department that employs positive adoption and implementation of technology can attract funding. This fact cannot be ignored.

Through producing an electronic culmination of their work, WSU addresses this critical element of funding in dance education. In terms of producing something tangible, dance has historically fallen short. The e-portfolio required of each senior in WSU's dance program is a digital product, able to be evaluated and analyzed both academically as well as professionally. Like WSU, dance departments should explore funding for technological resources that support and enforce their dance program. Without impacting other university resources, innovation can be achieved by incorporating technology.

Broadening teaching methods in the sense of traditional dance training to constructivist practices should also include expansion of a dancers' core curriculum with technological training. This research supports access to funding via technology integrated dance curriculum. Dancers able to utilize technology as a tool in enhancing and supporting their performance can increase their value in the university as well as the emerging global economy.

Meaning in education is often tied to relevance and resonance with the learner. As previously discussed, Risner and Anderson (2008) summarizes that it is best to

incorporate a, “Social constructivist theory of teaching and learning in which construction rather than reproduction of knowledge seeks to engage and empower students in their own learning responsibility” (p. 115). Rather than regurgitate information, constructivism’s parameters hold that the learner should be constructing their own meanings and relevance from the information they are given. Constructivism has challenged the traditions of classical dance training over the last half of the twenty-first century. Constructivist practices highlight the relevance of technology for dance education wherein technology can act as a tool for reflection, assessment, and feedback.

Van Dyke (2012) mentions that interactions, collaborations, and discussions allowing two-way learning in the place of lectures, are gradually becoming standard practice. In technique and choreography classes, it is likely to learn with and by your peers. While the methodologies of constructivist practices are often being applied in the classroom for dance, technological integration is often ignored within university dance departments as an enhancement of this approach. My examples have shown that students can construct their own knowledge, self-reflection and evaluation from in-class video. Additionally, it is proven that in-class video can provide structure for building a transparent, mutually understood, and culturally relevant criteria for assessment.

While dance education has begun to embrace constructivism in the studios and classrooms, technology integration has been ignored for numerous reasons. Research from authors Dania, Hatziharistos, Koutsouba, and Tyrovola (2011) of *Procedia Social and Behavioral Sciences* investigate this phenomenon. On research for dance and physical education, they find the following:

However, the research relative with the influence of technology on dance education (taking dance both as a motor skill and as a social and/or cultural work of art) is still at the beginning. According to Calvert, Wilke, Ryman, and Fox (2005), dance is possibly the only branch of education, which was late to adopt technology's applications. The same authors attribute this fact to two reasons: a) the unwillingness of dancers and dance choreographers to let any media stand between them and their live kinesthetic experience and b) the low marketability of this branch, due to which the newly devised technological applications delay to develop and co-opt in the market place. (p. 3357)

The reluctance of choreographers to move away from creating movement with a body or bodies in an empty studio, combined with the slow adoption and dissemination of new technologies has created a divide. Although the findings from these authors are without palpable solutions, and leave several questions unanswered, their research is critical when considering the application of tools for technology in dance whether the technology is used or not. More importantly, the technological savvy of a dance program's incoming student population should have significant posture on the decision to use integrated technological curriculum. When considering this, attention should be paid to the state standards of computer requirements at the secondary education level.

Throughout my research on this topic, it was difficult to find strong evidence-based research published with quantitative results in university dance programs. This furthered my resolve to continue to write about the topic and find research that would support the integration of technology for the advancement of dance programs. WSU's DDL program is one of the only studies done with required, integrated dance curriculum

that shows advancement in student achievement. WSU is not the only university to implement technology, but there are few that have implemented and published about the results.

Anderson (2012) stretches further into the future for dance department implementation of technology by speaking about music and video instruction. He quotes Risner who calls for “unlearning” (p. 24) on the part of the instructors. He mentions problems with elitism, social and cultural perspectives in learning and teaching, and responsive pedagogy that can be adapted to current needs. In my own evidence-based research, these same issues are relevant to the field of dance and technology in university dance programs. While technology is not the sole solution, it is a field that is able to adequately respond to all of these issues facing students and educators today.

Discussion and Summary

Concerns about the course of post-secondary dance education are not unfounded. While the focus of university dance departments varies, this research supports that integrated technology training can both enrich and enhance dance artistically and academically. Whether a comprehensively integrated program, or a single course with targeted outcomes, establishing technology integrated curriculum at the post-secondary level must be considered.

Without technological integration to the curriculum in dance education, the field will not have recourse to remain relevant and resonate with the public. My research supports that technological integration is critical in preparing future dance educators and responding to the needs of current students. As administrators, faculty and staff begin

to evaluate technological pedagogy for future instructors, it is crucial that technology is contextualized. Liejen et al. (2009), Risner and Anderson (2008) and Harding (2012) provide examples of how technological implementation becomes positive adoption. A co-constructivist approach to learning with dance and technologies, as well as the support of faculty, administration, and staff is a clear solution.

Without quantitative studies about dance and technology pedagogies, researchers and funders have little foothold for developing dance in this direction. Looking to scientific research through multimedia learning theory only further delineates the need for empirical data with connections between movement modalities and technology. It is crucial that universities take ownership of this asset, and while varying degrees of integration are occurring, publications that evaluate dance and technology implementation are absent. Programs currently implementing technologies must publish their research for assessment.

Risner and Anderson (2008) have paved a path for required, integrated technology pedagogy, but apart from this research, I found a lack of pedagogical models in this field. A progressive and aggressive approach to integrating technology is essential to push the boundaries of dance education. As Risner and Anderson (2008) mention, while “dance education has the ability to provide important pioneering expertise for the larger field of post-secondary education innovation” (p. 121), university dance departments are generally falling behind in this crucial phase of pedagogical development.

My research supports that required integrated technology training assists students in articulating and expanding foundational dance studies using innovative

strategies. It is my vision to continue to research topics of curriculum development, relevant pedagogies and implementation of tools for technology integration that are accessible and easily adaptable.

This research finds that technology integrated dance curriculum is a powerful tool for knowledge construction. Technology integrated dance curriculum can enrich dance department resources, and should continue to fund research in this area. Positive adoption of classroom technology in alignment with outcomes using specific technologies becomes a co-constructivist practice that empowers artistically and academically. The post-secondary dance program considering dance and technology integration must assess incoming students' capabilities with technologies, and practice a co-constructivist approach towards incorporating technology to facilitate pioneering achievement.

Reflecting his feelings about dance and technology succinctly relevant to this research, Risner poignantly states, "If instead we choose to maintain our current pedagogical approach, we still have to somehow contend with our relevance in a world in which a 12-year-old with internet connection in Zaire can locate and view a video of Graham's *Lamentation* as quickly as the head librarian of the New York Public Library Dance Collection, and then share it with her social network even more quickly" (2010, p. 100)

References

- ADaPT. (n.d.). *Association for Dance and Performance Telematics*. Retrieved December 2, 2012, from <http://www.dvpg.net/adapt.html>
- Almeida Amorim , J., Moraes Sarmiento Rego , I., Siqueira , J., & Martínez-Sáez , A. (2011). Defining the design parameters of a teacher training course on the incorporation of ICT into teaching practices. *Procedia Social and Behavioral Sciences* , 15, 653-657.
- Anderson, J. D. (2012). Dance, Technology and the Web Culture of Students. *Journal of Dance Education* , 12 (1), 21-24.
- Anderson, J., & Risner, D. (2008). Digital Dance Literacy: an integrated dance technology curriculum pilot project. *Research in Dance Education* , 9 (2), 113-128.
- Arnold, M. (2002). The Glass Screen. *Information, Communication & Society: ICS* , 5 (2), 225-236.
- Balsamo, A. (1999). *Technologies of the Gendered Body: Reading Cyborg Women*. Durham, NC: Duke University Press.
- Birringer, J. (2002). Dance and Media Technologies. *Performing Arts Journal* , 24 (1), 84-93.
- Birringer, J. (2004). Interactive dance, the body and the Internet. *Journal of Visual Art Practice* , 3 (3), 165-178.
- Brown, A. (2011, Mar-Apr). Relationships, Community, and Identity in the New Virtual Society. *THE FUTURIST* , pp. 29-34.

- Cruikshank, L. (2001). Avatar Dreams: Theorizing Desire for the Virtual Body. *Michigan Feminist Studies* , 15.
- Dania, A., Hatziharistos , D., Koutsouba , M., & Tyrovola , V. (2011). The use of technology in movement and dance education: recent practices and future perspectives. *Procedia Social and Behavioral Sciences* , 15, 3355-3361.
- Foster, S. L. (1995). An Introduction to Moving Bodies. In S. L. Foster (Ed.), *Choreographing History*. Indianapolis, IN: Indiana University Press.
- Gibson, W. (1984). *Neuromancer*. New York, NY: The Berkeley Publishing Group.
- Gonzalez, J. (2003). The Appended Subject: Race and identity as digital assemblage. In A. Jones, & A. Jones (Ed.), *The Feminism and visual Culture Reader*. New York, NY: Routledge.
- Hayles, N. K. (1999). *How We Became Posthuman; Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago, IL: The University of Chicago Press.
- Harding, M. (2012). Assessment in the High School Technique Class: Creating Thinking Dancers. *Journal of Dance Education* , 12 (3), 93-98.
- Leijen, A., Lam, I., Wildschut, L., Simons, P. R.-J., & Admiraal, W. (2009). Streaming video to enhance students' reflection in dance education. *Computers & Education* , 52, 169-176.
- Sanchez-Franco, J. M., Villarejo-Ramos, A. F., & Martin-Velicia, F. A. (2011). Social integration and post-adoption use of Social Networking Sites: An analysis of effects on learning performance. *Procedia Social and Behavioral Sciences* , 15, 256-262.

- Risner, D. (2010). Dance Education Matters: Rebuilding Postsecondary Dance Education for Twenty-First Century Relevance and Resonance. *Journal of Dance Education* , 10 (4), 95-100.
- Van Dyke, J. (2012). Questioning Trends in University Dance. *Journal of Dance Education* , 12 (2), 31-36.