Ex-Scribing the Choroegraphic Mind – Dance & Neuroscience in Collaboration

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Abstract

Today, one of the most compelling conversations in trans-disciplinary engagement is the exchange between dance and neuroscience. Over the last decade, dancers and neuroscientists have come together to create live artscience laboratories in which to explore the processes underlying “choreographic cognition” and the embodied mind. Whether creating, performing and viewing dance, complex multi-modal physical and mental processes emerge indicative of high levels of creative thinking. Cognitive processes generated in dance making have potential benefits that stretch beyond aesthetic aims. Such benefits are tangible and extend into many different sectors of society: humanitarian, sociocultural, scientific and medical. The last decade fostered a number of formal dance-science exchanges and projects, with significant outcomes -- statistical and practical, aesthetic and scientific. Despite initial momentum, the field remains fragmented, with poor visibility. Creative clusters have not advanced theories or methods to evolve a focused discourse. While major funding sources have fertilized the ground beyond the pilot level in Europe, US funding sources have little grasp of the importance of this topic and its cross-disciplinary impact. Although dance affords extensive opportunities and benefits for the academy and for the welfare of society at large, projects face barriers to advancement, including clarity of a strategic vision, funding, access, and underdevelopment or resources, and substantive commitment and cohesion across disciplines. Several directions are needed to address these barriers. These include alliances forged within educational and cultural institutions to create environments that fully support cross-disciplinary creative research.

Introduction

Among the most important cultural movements of the 21st century, arts-science collaborations lead in research and pedagogy (Edwards 2011). While these interdisciplinary currents carry enormous momentum in many sectors of art, science, and technology, dance is yet to become a recognized player, both within and outside of the academy. Between 2009 and 2012, the publication Leonardo (the International
Society for the Arts, Sciences and Technology put out an international call for submission of interdisciplinary curricula. Of the 70 courses received (largely from the U.S., both undergraduate and graduate), none involved dance (http://www.leonardo.info/index.htm and http://www.utdallas.edu/atec/cdash/).

Within the last decade, efforts have been made to document the degree to which dance has impacted positively on social capital and wide sectors of community cohesion (Guetzkow 2002; Mitchell, Innoue and Blumenthal 2002; Reid 2011). Results have shattered the perception that dance is an esoteric, elite discipline devoted solely to ‘art making.’ As a distributed art form (Kirsh 2011), dance finds its (meta)physical axis in collaboration. Dance “exscribes,” meaning that through dance, processes unfold that make the implicit clear and explicit. Particularly relevant are the ways in which dancers physicalize thought. Dance is a prime example that cognition is for action. The kinds of problem generating and problem-solving in dance extend well beyond aesthetic values (deLahunta 2004). Further, today’s dancers lead “hybrid lives” (Risner 2012: 185), sourcing from everywhere, far beyond the studio to find work and inspiration for research in unusual and uncustomary niches within society. The compendium of skills trained in dance impact on a range of sociocultural impact: material, psychopersonal, physiological and intellectual benefits (http://blog.worldprime.org/post/dance_research).

The processes of dance making are a unique form of embodied thinking and offer a unique window into our capacity for creativity and design. Today, cognitive neuroscience has chosen dance as its muse. Over the last decade, a rich dialogue has developed between neuroscientists and dancers. The dialogue addresses many issues around ‘embodied cognition’ in a movement-based art form that impact widely on both the intelligentsia and society at large.

The exchange is illuminating new ways of conceptualizing the interrelationship of thought and motor skill. Highly interactive forums and subsequent projects in applied research on choreography and neuroscience, new technologies and behavioral methodologies have evolved - computer languages and algorithms in software engineering, motion-capture analysis, and neuro-imaging, among them. New strategies and expertise are emerging with utilization of new materials and technologies in practice-led research. Leading the initiatives were key choreographers from Europe and Australia, including William Forsythe (Ballett Frankfurt), Wayne McGregor | Random Dance UK, and Shirley McKechnie and Catherine Stevens, University of Melbourne. Each has generated projects close to home, with research extending several centers for cognitive neuroscience in the US (David Kirsh, University of San Diego and Scott Grafton, University of California at Santa Cruz). These pilot initiatives were multidirectional, multi-dimensional and practice-led, engaging a wide range of information technology and digital media. Outcomes have been significant and are not reserved
solely to creative products. Rather, these engagements affect our theoretical understanding of across a number of domains – cognitive and affective neuroscience, phenomenology, neuropsychology, and human movement science. Topics include (but are not limited to) embodiment, embodied cognition, motor control and motor learning, kinesthetic empathy, performance and motor skill optimization, and health/welfare of multiple populations.

Despite the enthusiasm and commitment of a growing body of international researchers, advancement of this nascent field remains stymied by various barriers (outlined below). These hinder the ease of engagement and execution of projects holding initial promise. Generally, the field remains fragmented. Little research in this area is being generated in the U.S., and few connections are being made with European and other world counterparts. Overall, the vision for the field-as-discourse needs to be clarified with better development and utilization of resources to create consilience and cohesion, both within and outside of the academy.

To work towards a truly viable, reliable and sustainable trans-disciplinary engagement, the following barriers need to be overcome:

1. Ecovalidity – Identifying and affording access to feasible sites (physical and virtual) where research can be dance-specific. This includes issues of type, size, location, accommodations and removal of excessive encumbrances that potentially alter or limit the legitimate dance environment; Yet, these environments ideally can incorporate the technology needed for investigation;
2. Feasibility - Developing models of engagement that allow for realistic time and scheduling to carry out research for all engaged parties and resources. This includes embedding in the research design the mutual feasibility of time and use of resources, as well as garnering realistic time-sharing for those project managers and researchers across the various disciplines;
3. Training - Establishing short-term cross-disciplinary training and sharing of expertise in both the vocabulary of respective disciplines, methodologies and technologies; Training will help avoid the “salad effect” of interdisciplinary projects which are only disciplinary in name;
4. Partnerships – Business and Sociocultural partnerships are needed to broaden the dialogue in ways that facilitate the democratic engagement of all participants. In this way, we build the trust and commitment to integration and fertilization of this unique knowledge culture, avoiding top-down and bottom-up hegemony;
5. Financial Support- While major funding sources have fertilized the ground beyond the pilot level in Europe, US funding sources have little grasp of the importance of this topic. Identifying a range of funding sources that, collectively, could share the financial burden in supporting research and in turn, reap benefits, philanthropically and financially;
6. **Cost-Effectiveness** - Prioritizing cost-effective technologies and management of material and non-material resources. This means developing a clear sense of the ratio of resources-to-product outcomes;

7. **Precise/Concise Research** - Bringing precision to the research questions raised so as to generate concrete and useful data that best supports the speculations and hypotheses. This requires building carefully on previous research designs and honing the new hypotheses to avoid impasse due to imitations within the technologies themselves.

8. **Incentives**. Further, collaborations should provide a substantive outline and methodology for artists to find pathways into fruitful engagement with scientists and vice versa.

9. **Global Portals of Visibility** – Many current interdisciplinary dance-neuroscience projects are operating as islands within campuses or as single artist-scientist project grants both within and outside of academia, with little to no knowledge, visibility, collaboration or sharing of resources.

10. **Future Legacy** - Such data should in part be destined towards supporting the initial scientific evidence of the effectiveness of dance within arts-science collaborations by way of dissemination and archiving (both digital and material);

11. **Broadening the community of stakeholders**, both academic and non-academic, will provide portals for shared ideas. They can be local, regional, national, or international specialists and databanks that provide grounding in theories, themes and practices. These communities will be committed to the passion of innovation while respecting the ethics of intellectual property and human resources;

12. **Community Sustainability** - Identifying the ways and means of generalizing results from these collaborations to multiple sectors of the lay public, including underprivileged, disadvantaged, otherwise ‘abled’ populations and the wider sphere of lay public engagement.

**Suggested Actions**

The plan is to turn constraints into workable incentives. These elements include concrete utilization of human resources, tools, laboratories and other working environments, funding initiatives, education and training in cross-methodologies, and other conditions that would support the trans-disciplinary vision.

The following practical solutions to these barriers are based around 3 main initiatives:

**Action 1 – Feasibility**

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Goal(s): Moving towards true trans-disciplinarity in which neither discipline becomes the other, but participates fully in the mutual engagement. This avoids the “Salad Effect” of Interdisciplinarity, in which two or more knowledge bodies agree to generate collaborative work, but whose results remain disparate, fragmented and lacking in epistemological or practical utility.

Generic Stakeholders – Universities (including deans to students), research funding sources, both inter- and extra-academic, professional societies and philanthropies, cultural industries, funding sources for the arts, community building and health and welfare.

Targeted Regional Stakeholders - A consortium of North Carolina Triangle and Piedmont universities - Interdisciplinary professors/teachers/students within the academy, particularly “translational” medical centers and organizations (e.g., Translational Science Centers of Wake Forest University Baptist Medical Center and Duke University Medical Center), or where interdisciplinarity has become part of the university vision (Duke University, Wake Forest University, Winston-Salem State University, Center for Design Innovation, Dance departments at Duke, Wake Forest University and North Carolina School of the Arts, and other university departments with which there are memoranda of understanding for research, such as University of Wyoming and Winston-Salem State University, Forsythe Technical College, and the Center for Design Innovation.

Suggested Actions –

A. Establish focus group(s) for dance-cognitive science within the university consortium, generated, organized and implemented by students with the major purpose of brainstorming on relevant topics, locating, collating and exploiting resources. The focus groups will take several forms:

- First, as networking ‘arts science cafes’ to take place at Krankie’s Café in Winston-Salem and Open Eye in Durham, NC. Here, professionals from the neuroscience and dance world in the associated academies in the larger North Carolina Triangle area will be invited to lead and participate in roundtable discussions.
- Offering Live webcasts and web-forums, which could also be connected to existing Dance-Science podcasting sites, such as DanceTech.Net.
- Formal research conference for dancers, scientists, other academicians and the lay public to provide the scope and benefits of choreographic cognition. The conference will highlight current examples of research dance as a live
laboratory where dance making has been explored through digital technologies.

B. Pursue Intra- and extra-mural grants to support sustain initial educational seminars, research training, and interdisciplinary courses; Further, identify funding sources that would provide initial seed money for pilot research, and research training, substantive applied dance-science projects, and provide adequate media publicity; access to related educational seminars and conferences; and Recruiting and offering stipends to a cadre of graduate/undergraduate and community workers to help with mechanics of implementing projects as they materialize.

Potential Stakeholders:
These funding sources will include Translational Science Center- and other intra-mural grant opportunities, the Dana Foundation, insurance companies such as MetLife (those with a track record for funding dance-science initiatives), and arts foundations such as the Mary Biddle Duke Semans foundation.

Action 2 – Visibility

Goal(s) – Promote the visibility of the groundswell of work from Action 1 in order to reinforce local, regional, national, and global sustainability; Join forces with other networks that already are spearheading initiatives in this area.

Suggested Actions –

A. Initiate and manage an interactive website (including weblog) that has several tiers – regional, national and international;
B. Ground Level Networking and Publicity;
C. Organize local versions of TED;
D. Search out, contribute to, and participate regularly in, dance/science websites that already routinely provide podcasts and other interactive forums – chiefly, Dance-Tech.Net http://www.dance-tech.net/
Targeted Stakeholders:

University digital media laboratories within the consortium, with student/faculty support for building dance-cognitive neuroscience networks – Sourcing for social networking sites and other media that would offer platforms for visibility. Examples include:

Action 2 – Measurable Impact

Goal(s) - Provide material evidence of success of liaisons and collaborations; Define and substantiate the basis for success of liaisons and collaborations, as well as the mutual benefit mutual benefit of research; Move towards discourse.

A. Community engagement - Interactive seminars with artists, scientists and lay public to find niches outside of choreography that would benefit by dancers’ physicalized form of cognition (examples)
   a. Business/Community Partnerships (e.g., of topics: Problem-Solving in Business Through Dance; Improving Learning through Training Attention – High School; Dance and Health; Memory and Movement in Aging; Dancing with Challenges (Parkinson Disease);
   b. Bring together choreographers and dancers, cognitive scientists, neuroscientists, and other academicians, scientists, and those in digital media and other technologies, for short, intensive, outcomes-based workshop series. The first workshop would address the needs specified above and emphasize strategizing to solve the problems. Outcomes would be targeted towards the feasibility and realization of select projects to be implemented within a 1-year period.

B. Organize and implement outcomes-based interdisciplinary courses for under/graduate students. Courses would be designed to help students gain fluency in areas of intersection between disciplines, breaking through initial conceptual prejudices about their differences. These courses would be offered as single electives or as part of cross-campus visions for artscience trans-disciplinarity;
   a. Developing, honing and validating tools and methodologies through piloting research and providing structured feedback and evaluation;
   b. Build a student-faculty consortium of researchers dedicated to short, succinct, time-limited, measurable pilot research on dance and cognition;
   c. Transmission and dissemination of results – both scholarly and practical – through formal and informal publications, documentaries, web submissions, conference presentations, sustainable community initiatives, etc.
Generic Stakeholders: The consortium of universities and their extended network with national and international universities, dance/dance science organizations, neuroscience and cognitive science organizations, cultural industries and museums, private sector investors and community partners, publishers and digital media industries.

Targeted Stakeholders –

Examples of University-based Centers
Center for Creative Entrepreneurship, Wake Forest University
HASTAC the Humanities, Arts, Science, and Technology Advanced Collaboratory at Duke University

Examples of Arts organizations -
American Dance Festival, Durham, NC
Contact Quarterly, a Journal for Moving Ideas
National Dance Education Organization
International Association of Dance Medicine and Science
The Mary Duke Biddle Foundation

Examples of funders supporting interdisciplinary arts-science initiatives
The Wallace Foundation
The Dana Foundation
Pew Charitable Trust
National Endowment for the Humanities

Examples of Community Partners
John Hope Franklin Institute
Chamber of Commerce
Local Art Museums, such as SECCA (Winston-Salem) and Nasher Museum (Durham)
Mayor and other key political figures

Summary
The waters already are stirring in small eddies within a number of universities across the North Carolina Triangle and Piedmont regions of the State of North Carolina. It is only a matter of organizing our efforts with passion, vision, and rigor in elaborating outcome based efforts. To my mind, university students can play a significant role in jockeying a fleeting topic into a discourse of substance.

References


