Integrating Academic and Artistic Methodologies within a PBL Environment

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INTRODUCTION

The combination of artistic practice with scientific inquiry has a long tradition that dates back to Ancient Greece. Despite a long and rich history, there are surprisingly few established models for combining academic and artistic methodologies in higher education. In the past decades, institutions of higher education have highlighted interdisciplinary efforts that bridge art and science. The ongoing interest in combining art with science can be seen in the numerous academic conferences (such as SIGGRAPH and ISEA) that bring together academics, artists and technologists working at the intersection of art, science and technology. The popularity of high-profile festivals and cultural summits such as SXSW (South by Southwest), Ars Electronica, and CYFEST are instrumental in raising awareness of the relevance of art and science collaborations for mainstream audiences. The STEAM (Science, Technology, Engineering, Arts and Math) movement, pioneered by Rhode Island School of Design, was an early effort to address interdisciplinary approaches by placing art and design at the center of STEM teaching in primary, secondary and tertiary education. Despite the widespread adoption of STEAM by universities and institutions of higher education, there is no clear methodology for how to approach the ever-emergent, always-becoming interdisciplinary field of art and science. This lack has implications for higher education and programs that will train the next generation of creative technologists and interdisciplinary researchers.

Stephen Jay Gould observed that although "the sciences and humanities, by the basic logics of their disparate enterprises, do different things, each equally essential to human wholeness," both science and humanities can—and should—interact for the benefit of humans and societies, Gould, Stephen Jay (*The Hedgehog, The Fox, and the Magister's Pox*. p. 5). Simply because they do different things, we need not consider science and humanities as separate enterprises. In this special issue, we echo Gould's call for unity and expand it to include the arts. Specifically, we focus on the framework of artistic and academic methodologies as one possible avenue for discovering common ground and forging new alliances. Within the topic of art and

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science, subfields such as art and technology, bioart, interactive art, robotic art, and media art entail both methodological and epistemological shifts. In the post-digital, post-human, and Internet of Things era, artists frequently seek out exchange and collaboration with scientific partners. Scientists, too, incorporate artists or artistic dimensions into their methods and practices. Several high profile research institutions have adopted the artist-in-the-laboratory framework, including CERN, Ars Electronica Future Lab, Symbiotica, and HEXAGRAM Research Institute to name only a few. While the goals and logics of art and science are not necessarily aligned, there is mutual recognition within the academy to move beyond disciplinary boundaries to uncover new ways of working and arrive at fresh perspectives on research.

Recently, various educational programs have surfaced that aim to integrate artistic and academic methodologies. These educational programs take up the challenge of training students in both artistic and academic approaches with the hope that students trained in these practices will be more adept at navigating the world of research and industry, which increasingly require skills such as creativity, flexible thinking, collaboration and adaptability. On an epistemological level, this approach envisions the integration of concrete, affective, imaginary and abstract, model-driven reception, thinking and production. Problem-based learning (PBL) and research environments are particularly conducive to exploring the potential of artistic methods and integrating them into university pedagogy. This special issue focuses explicitly on novel pedagogical frameworks that combine artistic and academic methodologies within a PBL framework. We sought submissions from a broad range of disciplines across the arts, sciences, and humanities to understand how researchers and educators integrate artistic and academic methods especially – but not exclusively – within PBL environments. Bruun-Jespersen's article makes clear that Aalborg University is one of the pioneers for PBL in higher education. At the same time, the range of submissions included in this issue speak to the frequency and relevance of project/problem-oriented learning in higher education worldwide. We are delighted to include submissions from Parsons Design, Stanford University and Kolding School of Design. Also, the broad range of subject fields included here also demonstrates that art and science research ventures are not limited to the visual arts, but extend to the fields of design, architecture and dance. Looking across these projects and their novel frameworks, some key questions emerge:

- How can we envision an integration of academic and artistic methods that fosters an innovative methodology?

- How are artistic and academic methodologies defined historically, and which perspectives and discourses support their integration?

- In what ways to artistic methodologies supplement, broaden, or work against the tenets of the PBL approach?

- Does PBL have a theoretical base through which we might conceptualize the integration of artistic and academic methodologies, for example, by allowing for different degrees or modes of integration?

- What are the challenges or trade-offs of combining artistic and academic methodologies? What is gained and what is lost when we move across disciplinary and formal boundaries?

- How can the integration of artistic and academic methods be realized in concrete teaching practices within an PBL environment?

Each of the essays in this special issue engage directly with these questions, and in doing so, help uncover points of convergence and connection, indicating paths forward that might lead to a substantive reshaping or rethinking of the role of the arts and artistic methods within an academic framework. The articles cover a wide range of subjects and fields, and it is interesting to see how they each approach the above questions from unique perspectives. It is also revealing to see what challenges are shared – from university to design schools to art programs. Each of the articles approach the possible integration of artistic and academic methods from within their own field of practice, either the educational field or the field of research. Line Bruun Jespersen reflects on the importance of problem formulation that can cater for artistic solution finding approaches. Connie Svabo and Michael Shanks elaborate on the term and practice of *scholartistery* (first coined by Lewis and Tulk) both in academic terms and as fiction. Alexsandro Da Silva's article approaches the topic from the perspective of a graduate student project conducting artistic research; he presents a novel project that demonstrates how a dance performance can be framed as an artistic research project within a PBL framework. Focusing on pedagogical practice, Ellen Pearlman examines the role of the instructor to facilitate collaborative team work in a new course on the emergent field of cyborg art. Isak Worre Foged presents a novel architectural design method he applied in several educational projects at Aalborg University that involve the strategic implementation of sequential primary generators. Falk Heinrich elaborates on the theoretical possibilities of the integration of academic and artistic methods by re-thinking of Koestler's concept of bisociation on the basis of an interdisciplinary workshop for students of two different programs.

One major theme that cuts across all of these contributions is the artistic problem: is there a need to define an (artistic) problem, or does problematization hinder the artistic unfolding of intuition and ideas? If the formulation of a problem is at the core of PBL, how should an artistic problem be formulated? Jespersen considers this question most directly from perspective of the Art and Technology bachelor curriculum at Aalborg University. How a problem is defined within the framework of PBL fundamentally shapes the possibilities for research outcomes. On

the other hand, Pearlman observes that creative practice does not typically begin with a problem, but a 'messy situation.' Both authors' views on the nature and role of the artistic problem contrast with da Silva's understanding of creative/artistic practice as intuitive, and thus orthogonal to the problem-oriented nature of design practice. Foged makes a further distinction between problem-based and solution-driven procedures, but underlines the productive dependency between those two attitudes contending that architectural design processes are co-evolutionary process. However, Foged elaborates on the significance of primary generators (self-imposed, subjective value-judgments) that propel the design process. Foged sees these generators as integral to the creative-artistic aspect of design processes.

Another topic that emerges is the role that group work plays in integrating artistic and academic methodologies. Collaborative group work is a hallmark of PBL method, but the group dynamic plays out in myriad ways. Even the solo artistic research/performance project described in da Silva's essay utilises group dynamics by involving other performers into the research process. Pearlman offers another approach to group work: working within the same general theme, groups are each assigned a unique, defined problem. Jespersen also notes the advantage of group work, which affords opportunities for critical reflection-in-practice. Because students are required to communicate and collaborate in groups, they develop critical communication and reflection skills that require them to talk amongst each other about their work, discussing the results with their peers and supervisor. Heinrich uses the case of interdisciplinary group work to elaborate and concretize the workings of bisociation of artistic and academic matrices and codes, switching from Koestler's conception of individual creation to collaborative creation. Group work affords an iterative learning process, where students continually look back at the initial project proposal and reflect on their efforts through discussion, evaluation and contextualization, and also brings different matrices of thinking and perceiving into creative interplay.

Each of the contributions indicate the role and function of artistic methods as opening, freeing and sometimes disruptive to normative academic methodologies. Heinrich defines artistic approaches as fictionalizations or irrealisations of the problem at hand in order to allow for associations that do not explicitly follow academic reasoning and can therefore open up problem fields and postpone solution finding. Ultimately, this could lead to complex correlations between academic abstractions and associative-emotional experiences that widen the notion of knowledge. Svabo and Shanks explicitly single out the fictionalizing character of artistic methods by exemplifying their concept in form of a fictitious text about a guided exhibition tour. Here, they explain that artistic problem-based work does not necessarily start with a problem definition and its possible solutions, but with chosen pedagogical frameworks that support the "aesthetic, evocative, and imaginative" elaboration of the problem field. Pearlman reminds us that combining artistic and academic methods are not always seamless process: she discusses openly how students struggled with the sometimes "disruptive process of creative inquiry." The use of ANT is interesting here in light of how technological tools can

facilitate and open up new spaces for integration: technology is both the subject of inquiry and also central to the process of integration.

Institutes of higher education that adopt flexible methods and approaches can introduce interdisciplinary thinking at the ground level of learning, teaching and research. The articles in this issue demonstrate how artistic methodologies can broaden the notion of knowledge and redefine pedagogical approaches across the fields of art, sciences and humanities. We can look within this special issue for approaches that reconsider dominant models in higher education and the introduction of flexible and durable strategies for bridging the art and science divide.