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INTRODUCTION

I would like to begin by posing a basic question: as scholars and writers interested in art, how do we gain fresh insight into our subject? How do we ask questions we’ve never thought of asking before? Today’s presentation offers a simple, practical methodology for developing new insights as a basis for launching what could be for us as individual scholars new, hitherto unexplored research into the visual arts.

Simply put, the methodology identifies salient aspects of a professional practice or other serious endeavor about which we have considerable knowledge in order to compare and contrast those to the visual arts. The process of comparing and contrasting may call attention to aspects of art that would perhaps have otherwise gone unnoticed. I will use my own experience playing and composing music for classical guitar to illustrate how I identified three aspects of art that I had not previously thought about, and I will then consider their implications for art. These include the iterative, non-time bound process of musical composition; the universal and ongoing quest for improvement in musical performance; and the expressive element in music referred to as “dynamics.” To the extent that these three issues are relevant to the visual arts, they open up possibilities for new research that could then be addressed in the future.

Before we turn to the three issues, I need to make a few preliminary comments. First, I think we have to acknowledge that for some people developing fresh insights into the visual arts may not be an issue. The momentum of research and writing, for example, may carry scholars from one project to another as ideas evolve over time. Or, perhaps incidental conversations or reading may stimulate new ideas.

Second, some might say that musical performance and visual art are not really comparable, and for some purposes that may very well be true. However, when I refer to “comparing and contrasting” music and art, in practice I am not concerned with the extent to which they are similar or dissimilar activities. Instead, I am developing a side-by-side analysis of two different kinds of endeavors for the sake of concept development.

Third, in some ways, the approach I have taken in determining whether the ideas presented here are valid is sociological or perhaps I should say quasi-sociological. Almost none of the critical dicta of research methodology I am familiar with as a sociologist were used to interview artists. My discussion with artists, then, was simply an effort to gather anecdotal evidence to establish the various possibilities associated with the themes below. Therefore, at this point I am unable to generalize my findings. With that said, here are the three issues to demonstrate the methodology.
ITERATION IN CREATIVE PRODUCTION

Some composers can sit down and write a piece of music in a more-or-less continual flow. That flow may span days, weeks or even months, but once they begin a piece they move forward in a beginning-to-end manner without a great deal of backtracking for revision, refinement or change. Johan Sebastian Bach was known for that kind of compositional flow. Other composers, by contrast, will work on a piece for an extended period of time engaging in a seemingly endless process of revision. Beethoven, for example, revised extensively and was known to have agonized over a single note for long periods. This ongoing revision process is also associated with Vivaldi and other composers.

While I cannot say that I have agonized over a single note in any of my novice compositional efforts, I can very much relate to the iterative process of composing. In fact, it was my experience with this iterative process in classical guitar composition that initially called my attention to this issue in art. For me, sketching out a new piece means writing down notes on blank sheet music and then building on them to create an acceptable a piece of music. The process of writing them down then opens up a wide variety of problems that have unsuspectingly embed themselves in the work. After the initial notes are in place, I might notice problems associated with meter or the related issue of having too many or not enough notes in a measure, problems associated with right-hand or left hand fingering, or problems related to the fact that a section that I wrote doesn’t sound good anymore and needs to be changed. And there is a potential ripple effect since larger changes can have implication for other material that seems good as is. The result is that I can start out with an innocent set of notes only to discover that I am engulfed in a quagmire of compositional problems that cannot be glossed over, fudged, or otherwise rendered harmless without changing the music. I am then left with the arduous process of trying to work out my compositional problems one step at a time. This is indeed an iterative process and it can be surprisingly long and arduous. But once those initial problems are resolved one might consider a piece “finished” except that the resolution of a composition does not have to be permanent. Weeks, months, or even years after a piece is “finished” a composer can decide to add material, delete material, or move material around from one section to another. I’m not suggesting that material can be changed willy-nilly. But when needed, changes can be made. Research has shown, for example, shows that even Bach changed published music over a sequence of subsequent editions.

Now bear in mind that prior to engaging is this compositional process I was completely unaware of it. If you had asked me if composers go through an iterative process to develop their pieces I would have said “Yes, I guess so,” but I would have only said that because it seemed reasonable. Unless I had either experienced the process myself or someone had pointed it out to me, it is something that in all likelihood I would never have thought of. But now I do think about it, and now that I am aware of it, it raises what I think are interesting questions about fine art practice. Is there anything in visual art that is analogous to the iterative process in composing? With digital imaging, changes can be made ad infinitum. Similarly, photography (both digital and analog),
start with an initial photograph and then subjects that image to any number of manipulations that can be made days, weeks, months or years after the photograph was taken. Most other media, however, seem to set inherent limitations on the iterative process. Painters can scrape off paint that is either dry or wet and put down fresh paint. Or they can make a number of preliminary sketches of what they have in mind and then paint. But other than those possibilities, the options for iterative change are limited. When it comes to other media, you can’t un-chip a piece of stone, you can’t really un-weld a piece of metal, and you can’t change a piece of ceramics after it has been glazed and fired.

Yet, non-digital media is used, so there must be a control process that enables artists to “revise” the piece they are working on. What, if any, is the internal dialog that results in this process of control on the fly? How are decisions made that enable an artist to make changes while they can still make them, and if they are unable to make certain kinds of changes do they make other kinds of adjustments to the piece while there is still that possibility? In other words, are there iterative dynamics in a single work? And how do artists utilize those dynamics as they develop a piece from start to finish?

Here is another possibility: perhaps the process of iteration that is available to composers has a meaningful visual-arts analogy in an artist’s “series.” Pollock’s well known drip paintings constitute such a series. Was he trying to iteratively resolve technical, aesthetic, or other issues over the series of work, or was each piece self-contained and unrelated to the works that came before? The same questions could be raised about the “series” of many other artists. One abstract painter I talked to saw the work he does in a series as being an example of what he called concept development. He also said that for him a particular painting in a series is much like the movement of a symphony—complete and distinct, yet integrated into the whole. To what extent, if at all, are artists consciously dealing with this iterative dynamic? And, if there are or have been artists so engaged, who were they? Is there any available evidence of their conscious awareness of this process, and if there is such a record what impact have artists ascribed to this process? I don’t know the answer to these or the many related questions. All I know is that questions related to iteration in art seem interesting and potentially productive as a portal into understanding more about studio practice.

The difference between iteration in musical composition and in art is time. Musical composition is clearly non-time bound: a piece can be modified in any number of ways over an extended period and one can, in effect, go back in time through the changes that are made. Iteration in visual art, either in a single piece where appropriate, or in the context of a series has a linear time-bound, forward-moving aspect. An intriguing research might focus on the characteristics of time-bound and non-time bound iteration and how the difference between the two approaches shape creativity.

THE QUEST FOR IMPROVEMENT

We now move from musical composition to musical performance to discuss our second analytic concept. I think it fair to say that the quest for improvement is the one
preoccupation that all musicians share, and there seems to be two distinct but somewhat overlapping ideologies associated with that quest. One is the quest for perfection and the other is the quest to be-as-good-as-one-can-be. I don’t know to what extent musicians consciously align with one or the other of these ideologies, but what is clear is that over time musicians acquire a distinct sense of their personal limitations and potential, and this shapes their expectations about how good they can become. In time, certainly within a few years, would-be musicians develop a suspicion that they either do or do not “have it.”

Those who decide they don’t “have it” abandon the quest for improvement. That leaves becoming-as-good-as-you-can-be, the acceptable alternative for everyone else trying to make peace with their own limitations. This aspirational dichotomy is characterized by four important considerations. The first is that the perfection vs. the becoming-as-good-as-you-can-be orientation is not a function of practice time, quality of instruction, personal dedication or anything else that one can reasonably manage. It is associated with talent, a concept that I find credible and useful but that I acknowledge not everyone finds convincing. Second, the idea of perfection is not quite as absolute as it may appear because the judgment of knowledgeable audiences and critics notwithstanding, the performer’s self-assessment is to some significant extent based on his or her fragile and somewhat skewed judgment. Third, the analytic typology offered here makes no claims regarding the extent to which musicians are, or are not aware of these two ideologies. Rather, it simply posits that these ideologies are the likely possibilities for those who are self-conscious about their limits and potential for improvement. The fourth point is in some ways the most important for my purposes today, and it is a point to which I will return shortly when we raise the question about improvement in visual art. The self-assessment musicians make about the quality of their play and the degree to which they might improve over time have clear cut reference points. Those references are the live and recorded performances of acknowledged masters. While subjectivity in self-assessment can be significant, at least one can compare how one plays to the live performance and/or recordings of acknowledged masters playing the same piece.

But there are musicians with talent and for those who are truly gifted the idea of perfection is manifestly attainable. I will not try to fully develop the term here, but for the classical form various definitions of perfection typically include references associated with the flawless execution of all music notation including implicit and explicit note emphasis and volume dynamics, the correct execution of the melodic arch of a piece, an interpretative rendering that personalizes the music in a way that enhances what the composer’s intentions for the music may have been, and for those so inclined an interpretation that is stylistically rooted in the history of its corresponding musical period. Perfection may also entail the ideal realization of any other aesthetic qualities as defined by individual performers and/or the musical world. As far as I have been able to determine, the quest for perfection appears to be the preserve of professionals of advanced achievement as opposed to amateur musicians. In an interesting YouTube video, the famed international violinist Midori talks about her constant quest for perfection, which she explains, is something she achieves only on occasion.
With that said, we now turn to visual artists: are they consciously involved in the quest for improvement? If artists are engaged in such a quest are there ideologies associated with that? It is difficult to talk about “improvement” as a general issue in the visual arts and, therefore, it makes sense to ask whether the term is relevant to specific subsets of the field. Highly naturalistic representational art, for example, is often concerned with the correctness of light and color, correctness in perspective and spatial relationships, anatomical or botanical correctness, and the like. What is notable here is not so much the extent to which there is or is not an actual state of perfection attainable in representational art, but rather that there are reference points in the natural world for those to whom perfection matters. So, it is possible that the quest for perfection might be relevant to specific kinds of art practice. However, for the remainder of the discussion on “improvement” I will be referring to modern art from impressionism forward.

And when it comes to modern art, we are back to the original question. Are artists engaged in processes of improvement and do they organize their practice in any way around that? I have been around artists for most of my professional life and I have a strong impression that artist do not talk much about “improvement” per se. I don’t recall artists using the actual term very often.

To probe this further, let’s go back to the two improvement ideologies in music: perfection and becoming-as-good-as-one-can-be. The perfection ideology does not seem compatible with modern art, in large measure because of the fundamental premise that each artist should have a unique “voice.” So there is little one can point to as an external reference the way there is in music. The ideology of uniqueness, or “originality,” makes the idea of an external reference for perfection mute. If the work of each artist is unique, judging it in relationship to other art does not work, at least in the way it might for musical performance. Yes, artists are inspired by other artists, but that is a different matter.

But if we shift from the quest for perfection to the quest to be as good as one can be, then I think that ideology does apply to artists. To the extent that “improvement” in this second sense is meaningful to artists, they often use surrogate language to express it: words such as “growth,” “development,” “maturation,” “evolution,” “advancement,” “innovation,” “progress,” “refinement,” “revision,” “correction,” “alteration,” ”modification,” and “expansion.” All of these terms suggest a path of positive linear development. I spoke to a number of artists about this and all of them used language that implied their interest in a linear development that suggests improvement. Some artists balked at the term “improvement,” per se, and immediately defaulted to one of the surrogate terms. A photographer suggested that although her career has been organized around a constant pursuit of “growth or development” that she explicitly acknowledged implied improvement, she chaffed at the term “improvement” itself because to her it implied a preoccupation with technique. She associated a growing mastery of technique to “improvement,” and therefore felt the term did not reflect what she felt her life’s work has been about. There were a few artists, however, who did embrace the term “improvement,” but my impression is that most greatly preferred surrogate language.
DYNAMICS

The third and final analytic concept is something that is universally referred to in music as “dynamics.” The *Music Dictionary*, by Theodor Karp, describes dynamics as “shades of loudness and softness in performance” and as such it functions much like the hugely important dimension of intonation in spoken language. Musical scores occasionally have dynamic notation that the composer has written into the music, but much more often written music will have little or no such notation. It is then left to the musician to add hand-written dynamics to the score as a guide to his or her own expressive interpretation. When musicians see dynamic notation on sheet music, whether they have been included in the published piece or added by the musician, they sometimes translate those indicators of loudness and softness into terms such as “forceful,” “delicate,” “wistful,” “contemplative,” “lilting” or similar words that have expressive resonance. What is essential to understand is that most often the nature and application of dynamics is based on a performer’s decision. The use of dynamics, then, is a case study in expressive decision making. I should add parenthetically, that there are two other important expressive elements in performance: one is something called “tone color” and the other is “tempo change.” Time limitations prevent a discussion of these elements, but they are used less frequently, so the discussion of dynamics is enough to convey the point.

To illustrate the concept of dynamics, I’m going to play an audio file of a short piece I composed earlier this year. The guitarist is my teacher, Douglas Niedt, concert performer, recording artist, and chair of the guitar department at the University of Missouri in Kansas City. Doug was trained in the classical conservatory tradition at Juilliard, made his New York debut at the Carnegie Recital Hall at age twenty-one, and continued to polish his virtuosity in private studies at the Segovia Academy and with Christopher Parkening and Jorge Morel. In this video, Doug is playing *Composition No. 4* on a 1973 Ramirez guitar.

The question to consider next is whether or not there are similar elements in the visual arts and whether or not we can learn something new about art production by considering those elements.

One obvious difference is that in art we do not have the composer/performer dichotomy. In effect, an artist is both composer and performer. A work of art typically begins with an idea. And by an “idea” in this context I am referring to a vision or notion of what the artist is trying to produce. I have heard artists say that they always expect to be surprised by what they end up with when a piece is finished, and I think that implies an initial visual idea from which the outcome has departed. And how did the artist arrive at that finished piece? Through a series of decisions each one of which had the potential to fulfill the artists overall expressive goals, even if many of those may have evolved during the execution of the work. Consider the evolution of an abstract painting. In pursuit of the artist’s idea, decisions will be made about color. If red is used what kind of red will it be? Will it be a pinkish red, an orangey red, or one of thousands of other reds? Will the paint be applied with a brush, a pallet knife, or a fist full of twigs bundled
together? Will the paint be applied thickly or thinly? Will the brush stroke be conspicuous or unnoticeable? And, what of the various other components in the piece and the decisions made about them? There are issues of composition, scale, and spatial relations, and issues related to the overall color pallet in a composition. I would argue that each element represents an expressive decision that is analogous to the expressive decisions musicians make concerning dynamics. Now it might be said that paintings in a series are made with many basic decisions having already been made. Jackson Pollack did not begin his eighth drip painting asking himself whether he should use a pallet knife on the piece. That problem was resolved after he saw his first drip painting, which by the way may have started as an accident rather than a decision. But even if the initial drip painting started as an accident, other decisions were made along the way about the expressive potential of a drip or splatter, or about color and the flow of viscous paint.

The point is that creativity is a process of decision making; and just as the application of dynamics is a case study in expressive decision making in music so too is the application of the components of a painting or any other piece of work a case study in expressive decision making.

Decisions in art production, especially in light of decision theory, deserve a longer discussion than we have time for here. However, there are a few key points that need to be made in order to establish the case that decisions about the elements of art making are in play. And, before I do that I want to be clear about why this matters here. The analytic point I am making with regard to dynamics is that this hugely important element of creative expression for musicians has a parallel in the visual arts. But that is only true if the nature of conscious engagement leading to variation in sound volume in performance is meaningfully similar to the nature of conscious engagement leading to the choices artists make in producing their work. Although I have chosen to use “decision making” as the rubric for linking artistic choices to the concept of dynamics, it is certainly possible to carry this discussion to the same conclusion without focusing on decision-making, per se. But I am doing so because in my view it has the distinct value of operationalizing the vicissitudes of consciousness.

So in brief fashion, here are some of the key issues that underscore decision-making as a central process in artistic production. First, let’s clarify an important distinction between consciousness and precociousness made by A. C. Maclntyre, in his philosophical treatment of psychoanalysis. The pre-conscious is a level of awareness that can only be achieved through an act of what Maclntyre calls “ordinary introspection.” By this he means a process of self-reflection that triggers conscious awareness. That is a formal way of referring to what happens if you say to an artist “I notice you are using a particular red here. Do you realize that that choice was based on a decision?” One response from the artist might be “Yes, I’m aware of that.” Such a response would provide evidence that a conscious choice had been made. But another response might be “No, that’s not what was happening. Actually, I have no control of the kind of red I use. I just start mixing color, ended up a red I liked, and that started using it.” To which the interlocutor might respond, “But how did you know when to stop mixing your red and start using it?” To push the point slightly, this is an example of what is sometimes
referred to as heuristic decision-making or decision-making that involves routine and taken-for-granted choices. Using Macintyre’s framework, we would call them preconscious choices. I realize not everyone accepts the idea of creative intuition in creative decision making, but for those who do the concept of precocious choices is essential. I suppose I could have simply said that “Artists control their own art-making process and that implies conscious choice and thus decision-making in creative production.” So to reiterate, I would argue that visual artists make decisions about how to execute their work that are similar enough to decisions about the use of dynamics in music to make their conscious or precocious choices a relevant subject for further inquiry.

The only other thing I want to do here is refer to a few of the artists I interviewed about this. One artist related positively to the idea of what I will now call visual dynamics as they relate to his work, which uses fabric to construct abstract two-dimensional compositions. He made a distinction between “constants” and “variables” in these collages. The constants have to do with basic design and compositional decisions that once made could either not change or would be massively disruptive to his work if they had to be changed. The variables involve choice of fabric color, patterns, and texture as well as choices about other material such as wood, metal, or the other decorative elements he sometimes uses.

A painter also related positively to the idea of visual dynamics and talked about how he makes an initial drawing or set of drawings of his abstract, color-field works and then makes a variety of decisions about color, opacity, paint thickness and the visibility of brush or palate knife stokes. This reference is especially interesting to me because it suggests that his initial drawings are somewhat analogous to the notes in a piece of music and his treatment of color and the like being akin to the expressive function of musical dynamics.

CONCLUSION

I’ll close now with a few very brief comments about the methodology that I’ve outlined. My presentation sketches out a few basic questions in each of the three sections that suggest potentially useful research questions that in my view merit further investigation. Time limitations preclude discussing those here. However, the purpose of my presentation is not to examine those questions, but rather to provide examples of the methodology in use. My examples were based on comparing and contrasting music and art, but I would argue that this methodology could be used by comparing and contrasting art and any other field of professional practice or serious and sustained activity.

Finally, I would readily admit that the issues of improvement, iteration, and dynamics in music and art production are a reflection of my own academic background and personal interests. The result was an examination of creative process. But I believe the comparative methodology I have outlined could just as easily focus on other issues such as creative content, socio-cultural context, philosophical and aesthetic issues, history, economics, psychology or any one of a number of other subjects or perspectives. And
this is an essential point because the methodology I have suggested is not an end in itself. It is simply a process by which new analytic avenues can be discovered and explored. Once those issues have been identified, researchers would be poised to move beyond the methodology and focus on new topics for investigating the visual arts.
WHY ASK WHY?:
INTERROGATING THE QUESTION

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ANSWERING THE CALL

Upon encountering the title of this conference, “Why Study Art?,” I initially thought about the longstanding felt need within the art education community for discovering and articulating arguments that justify the function of the arts in society. I thought of arguments used by many art professionals and their supporters to defend the arts (and the humanities) from scientistic or other attacks that sought to belittle their importance. Interpreted in that way, the question invited answers (justifications) that would also address the question “What good are the arts?” and would rest on the ubiquity of art to human life as it has been lived everywhere through all of human time. If art wasn’t valuable and served an important function, this line of thinking goes, would human beings have always devoted resources to it? Every art professional has probably participated to some extent in discussions of this kind and can show a scar or two from fisticuffs in that particular boxing ring.

However, having read the first paragraph of the conference announcement/call for papers (Given in Appendix 1, from this point “A/C.”), I felt that my initial reaction had been in error. The framers of the conference were thinking in a different direction. The topic of the conference, it then seemed to me, was not going to center around the question that I paraphrased above. Rather, it seemed that the conference would focus on the role and efficacy of studying art in art school.

The second paragraph of the call shifted my understanding of the topic again, as it retrospectively reframed the first paragraph as a complex rhetorical question by asserting that students indeed need art school, and listed a number of positives they can enjoy from participating in that context. Ah, I get it, I said to myself. The purpose of the conference is to serve as a forum for discussion of all the reasons for studying art that can be constructed around the above-mentioned list of the second paragraph, ending with “delight.” I envisioned a conference that would become something like a round of toasts, or a bunch of fishermen swapping stories of the prize-winners they had landed, with a little of the flavor of a campfire sing-along thrown in for good measure.

Not so. The third paragraph of the call brought my ruminations back to earth by pointing to some of the trends that can be discerned within the field of art education (and of education in general) and indicating that the conference would explore “the purpose and meaning of attending art school,” given the changing social conditions within which the art school functions. My summary version of the question articulated in this paragraph is therefore, “How is the delivery of the goods listed in paragraph two to be accomplished under radically changed and rapidly changing conditions?” In that third paragraph, the
community of educators of future artists and art professionals is invited to reason together to address a situation fraught with potential opportunities and possible hazards. The call in its entirety is asking, “What is the situation in our society and our field, and how are we going to deal with it?” Or, more specifically, “Given that we in this discourse community believe in the efficacy of art, let’s talk about how we’re going to keep up with the times and serve to extend the changing tradition of art into an emergent future, so that the art can continue to fulfill its social function.” The call masterfully defines the discourse community and frames the discussion. The times are changing, and the education of artists and other art professionals must, it is certain, change with them. It is assumed that art is essential and will continue, but that professionals tasked with educating artists must work together to remain relevant.

Thus, the participants in the conference were invited to enter into a practical discussion framed by the entirety of the A/C. The discussion is not so much in relation to the why of studying in an art school, despite the title of the conference, but rather the how of studying, and, concomitantly, of teaching—so that the changing situation of the arts and art education can be addressed. This is a salutary discourse, and I will not in this essay gainsay that purpose. However, I still find that the title question nags at me. I feel that it has cast a shadow over the entirety of the A/C, and cannot be explained or reframed into docility by the paragraphs that it heads. I feel that this question is ultimately what gives the A/C its urgency, and I feel it must be directly addressed. Why, after all, is it the title of the conference? Why ask “why?”

In my response to the A/C, therefore, I want to direct our attention for a few moments to my original expectation of what the conference was going to cover, to the original title question, and to share with you my thoughts on it. I want to begin this exploration as if the question had been asked without any of the paragraphs for which it served as heading. This is a philosophical inquiry that answers the A/C not by directly providing a response in the discoursal space so gracefully defined by the text of the entire call, but rather takes a metaphorical step back, and examines and comments on the question “Why Study Art?” in more general terms. For, as stated above, I believe that this question truly underlies all of the discussions that have been prompted by the A/C. I am very probably writing here against the trend of the conference, but I hope my activity is not like that of a galley oarsman who is pulling his oar the opposite direction and out of time in relation to his colleagues in the bank of oars, but more like one who sees that it may be helpful for him to stand up in the stern of the boat and use his oar to steer. Let us see what emerges in the process of examination of and commentary on the title question. Perhaps we will become more aware of the boundaries of the discoursal space created by the A/C. Hopefully an answer to the title question will emerge.

INTERROGATING THE QUESTION: “WHY STUDY ART?”

“Art”

I would like to proceed by focusing on each word of the question in turn. However, with your indulgence, I will not here explore the term “art.” The forests of philosophical and
theoretical print that surround that word in the professional discourse in which this text proposes to intervene are far too extensive and thickly overgrown for us to make our way usefully in that shadowy labyrinth. In a text such as mine, there is not world enough, nor time. Rather, let us allow it to be what Morris Weitz, appropriating a term from Wittgenstein, called an “open term,” and I will direct our attention to the other two words of the question. I will first draw out some implications of the word “study” in the contexts of the arts and art education.

“To Study”

Ezra Pound once said, “Back an American into a corner and he comes out with a quote.” Today, that American googles the topic before he attempts his riposte. Reading through the definition of “study” I found online (Dictionary.com) (Appendix 2) while keeping in mind the use of the term in the question quoted above, I noticed a number of things. First, most of the more common definitions of the term, both as noun and verb, partake of a logocentrism that is part of the intellectual context in which the arts and, especially, art education function. In the language of standard usage, “studying” is, more often than not, something one does in order to “know” information, which knowledge is demonstrated by producing a discursive text. I have underlined in the appendix those definitions for which I believe this is true, and have marked in red those aspects of any of the definitions that explicitly counteract the logocentrism to which I am pointing. Those definitions neither underlined nor containing words in red I interpret as “neutral,” in the sense that the symbolic products resulting from the processes alluded to in that definition may be verbal or nonverbal. A quick glance at the text of Appendix 2 shows the predominance of logocentric definitions, 11 of 18, with the other 7 being neutral. Of the 7 noun definitions, only 1 is neutral, of the definitions of the verb form, 6 of the 11 evince a logocentrism. In only 2 definitions is there a specific reference to “art” or “practice” that could in some sense be interpreted as specifically signalling an openness to nonverbal symbolic products in response to contexts where that definition is in force. These definitions of “study,” together with their emphasis on the verbal, are not only predominant in common usage, but are especially so in the academy, and have been ever since the university emerged from monastic— that is, literate— institutions in the Middle Ages.

It is significant that art education was not part of the curriculum of the early university, and its relationship to the institutions of the Middle Ages was different from the subjects taught in the university. What follows is a brief, very general account of why this is so. Art education as a field emerged from the studio and the guild, with their reliance on oral teaching, imposed by a lack of literacy among the artisans. It was practiced within the social structures of apprenticeship. The entry of art education into the academic context occurred only in the second half of the 1500’s, hundreds of years after European universities were first founded. Those who created art academies, notably the Carracci, sought to emulate in many ways the practices of the university, in order to establish and enhance the social importance and prestige of the visual arts and of visual artists (Oxford Art Online). The effort was to assert the literacy of the artist and to differentiate the activities of artists from those of craftsmen, whose status during the preceding epoch was much lower than that of those who worked with words.
This differentiation of the artist from the artisan was pursued by using the analogy of visual to poetic production, which carried with it the prestige of knowledge that was based in literacy and the training provided by a university education, while also being recognized as a fine art. In service of the project of raising the prestige of the artist, the conceptual aspects of the artist’s role were emphasized, and the intellectual capability of the artist was affirmed. Artists were seen as capable of participating in discussions on an equal footing with intellectuals whose standing was ratified by the university tradition, even as their technical facility was very important. The term “study” was embraced as part of this agenda. Academic art came to emphasize in the education of the artist a familiarity with the textual tradition of Western Culture. This project succeeded, albeit with implications, which I will not rehearse here, for the content of works of art, not to mention increasing pressure on artists, who had to master the literature of Western Culture, as well as the technical means of the realistic rendering in two dimensions of a three-dimensional world.

The project succeeded, but there was a cost. The adoption of the language of the academy to art training was a deal with the devil. The fact that the term is historically inflected towards the verbal (and the mathematical) meant and means that the fit for the artist was and is never perfect. This was one of the trends that led to the emergence of an avant garde in the visual arts that functioned outside of the academy. The dominance of the academy and academic art, with this emphasis on narrative and text in the supplying of subject matter, lasted nearly 300 years. It would not be seriously challenged until the Romantic Period, and not banished to the sidelines until the Impressionists, at which time the logocentrism of academic art became something for the artists of the emergent avant-garde to resist actively.

This is a complicated story, and I can here only allude briefly to it in making my argument regarding the problematic nature of the word “study” in the A/C. The term vexes artists in the academic context to this day, and is part of the insecurity within the field, attested by the title of this conference. Although for those studying to work as art historians, art critics, and curators—roles for whom the core symbolic products (products necessary to the performance of the role) are texts which frame the reception and interpretation of texts, images or objects, the logocentric definitions of “study” more comfortably apply. However, for those artists whose core symbolic products are often not verbal, and for art educators, for whom the training of such artists is the central task, the use of the term “to study” as a general term to describe key aspects of their activity in relation to art production is much more problematic.

Visual artists and visual art educators, as they function within the academy, are thus like the narrator of a Samuel Beckett novel—walking through an unfamiliar landscape where they are not wanted and where they find they must use a language that does not feel like it belongs to them. The language of the academy comes to the art educator from a tradition that is to an extent foreign. The result can too often be a feeling malaise and of alienated insecurity—as evinced, for example, by the first paragraph of the A/C. Art educators, because of the nonverbal nature of the core symbolic products of artists, remain at a distinct disadvantage in the academy regarding the epistemological validity of
what they teach and how they teach it. The “fit” of the visual and plastic arts in the academy is uncomfortable, and that lack of ease can be observed as coalescing around the term “to study,” among other terms used in academic discourse.

What I am here asserting is that the field of art education works at a disadvantage exacerbated by using terms that, in most of their more common usages, does not accurately describe the central activity of the artist or art student, that of making symbolic products that invite by their framing interpretation as works of art. This disadvantage shows up in the kinds of texts that art students are asked to write, often being in imitation of critics or philosophically grounded theorists of art or culture or communication whose texts are only at best tangentially related to the role-defining practices of the artist. It also shows up in the continued questioning in the academy of the epistemological seriousness of the arts and of art education. The title of this conference itself supports this assertion. For thirty years, this conference has been dedicated to exploring the role of “the liberal arts and the education of artists,” embracing knowledge created in discourses other than those of art production, yet still, the question that entitles the last iteration of this conference remains, “Why study art?”.

I conjecture that it is this issue around the term “study” that has led to the adoption within the arts and arts education of the term “practice,” which does not necessarily involve the production of a verbal text as the central product, but rather implies the production of a performance which might be verbal or nonverbal. The focus is on what the artist does, not what the artist knows, whatever that means.

There are aspects of the education of artists, present in history and framing of this conference, which do leave those working within the field of art education “on the hook” in the use of the word “to study.” It is necessary for citizens of a democracy to be broadly educated so that they can participate fully in that political system. This points to the need for the liberal arts as a component of the curriculum of art students. In addition, a number of roles in the art world (industry?) ancillary to that of artist available to students, among them art historian, curator, and art critic, require intensive training in the reading and writing of discursive texts. Artist students also need to be trained not only in the studio, but also in the classrooms—to be able to participate intelligently in our society, as citizens and artists, and to be able to understand the texts of the other participants in the discourses of the arts, as well as, of course, creating texts from their own discoursal position. They have to know how and what to read to know where and how to place their works as discoursal interventions. This trend confers a greater validity to “study” as a term in the present situation of art education.

The arts remain the stepchild, the latecomer, who speaks with a decided accent, and doesn’t quite know how to behave. Note how I have to use the language (e.g. “field of study”) that I assert is part of the problem in order to describe the problem, so that the pitfalls of paradox are everywhere possible in my project of interrogating the question of the conference title. Although art educators can use the term “study” to describe what those enrolled in art school do—and call them students, rather than “apprentices,” our use of the term helps to ensure the persistence of the discussion regarding the value and
legitimacy of the arts. We are captives of our a professional language which was taken up to emphasize the similarity of the arts to other courses of study in the university, while we cling to the languages of self-expression and entertainment, and emotion, which separate the arts from the other fields. The language of “practice,” substituted in a mechanical way for the language of “study” will not necessarily address the problems inherent here, because to emphasize the difference between art education and education in other fields may only make worse the epistemological aspects of the issue that I am pointing out in this article.

Certainly, as workers in this field and participants in this discourse community, art educators must seek to transform their professional language. I will discuss below some of the means of transformation for the language that are ready to hand in the field of art education.

“Why?”

To elucidate the initial word of the title, I’d like to direct our attention to the second paragraph of the A/C, specifically to the last item in the list of goods that art school can deliver: “delight,” significantly isolated in a one-word sentence. When I read that word, I immediately thought of William Butler Yeats’s great poem, “An Irish Airman Foresees His Death,” published in 1918, near the end of World War I. Here is the text of the poem, taken from the website of the Academy of American Poets.

AN IRISH AIRMAN FORESEES HIS DEATH
William Butler Yeats

I know that I shall meet my fate
Somewhere among the clouds above;
Those that I fight I do not hate,
Those that I guard I do not love;
My country is Kiltartan Cross,
My countrymen Kiltartan’s poor,
No likely end could bring them loss
Or leave them happier than before.
Nor law, nor duty bade me fight,
Nor public men, nor cheering crowds,
A lonely impulse of delight
Drove to this tumult in the clouds;
I balanced all, brought all to mind,
The years to come seemed waste of breath,
A waste of breath the years behind
In balance with this life, this death.

This poem not only answers for me the question that titled the A/C, but also suggests an answer to that aspect of the question addressed in the first paragraph of the announcement, why art school is important in the training of artists. Those whose work
in the arts ultimately matters practice or, if you will, study art because of a “lonely impulse of delight,” unique to each of them. Neither that impulse nor whatever delight one might find through following that impulse is provided by art school alone, in spite of the inclusion of the term “delight” in the list of “goods” provided by art school in the second paragraph the A/C. Rather, art itself, as an exploration of all the possibilities explicit and implicit in its seemingly infinite variety, wherever or however it is practiced or experienced, can channel that impulse most effectively for some of human beings. Those who passionately produce art or who passionately seek out the experiences that works of art provide sometimes experience a delight in some significant way similar to that which has driven them to their own “tumult in the clouds,” and remains present, like a memory at the edge of consciousness, or a mirage, floating on the horizon, so that they can recognize it. These people are the ones who find themselves through seeking a place in the world of the arts, and they would be seeking that place, and following that impulse, wherever or whenever they lived.

The impulse of delight, however, was not enough to have gotten the airman of the poem where he was, doing what he was doing. In order to act on his “lonely impulse of delight,” he had to be a part of an organization. He had to be trained, supplied, supported, disciplined, and directed by the institutions that eventually got him into the air and kept him there. Talent and desire need training, if one is to be serious about one’s production, whether it be of artworks or texts. That is where flight school or art school comes in. One studies art in art school to follow one’s “lonely impulse of delight” in a context that will hopefully best discipline and inform it. One studies art in art school to maximize the range of one’s performance in following one’s original impulse—to deepen one’s practice, and to seek and find experiences that speak to, renew, and make more meaningful both that impulse and the delight that one hopefully finds by following it. This is not to say that art school is for everyone who seeks to be a serious producer of symbolic products within the realm of the arts, but those in the field of art education do everything they can to make it valuable.

There are sacrifices that must be made for the airman’s or the artist’s commitment. The airman in the poem is flying in service to a power from which his people are alienated. Significantly, this poem was written after a group of Irish radicals, several of whom Yeats knew personally, had used the British preoccupation with the war as an opportunity to rebel against English rule in Ireland. And artists (and art educators) must use a language that is not theirs, as is discussed above regarding “to study,” in order to get to their own tumult in the clouds. To follow one’s impulse, one must do what must be done. As Anna Deavere Smith put it in her commencement speech at SAIC in 2013, “You have to find out who The Man is in every situation.” The answer to the “Why?” of the art school involves both the lonely impulse and the need for a training, as much in dealing with the social contexts in which one’s role is practiced as in any technical aspects of its performance. Artist and airman are social roles, and that involves institutions and politics. For artists and art educators, one must operate within a context where the validity of one’s goals and means, the epistemological gravity of the field itself, are constantly questioned. This creates sometimes difficult and painful situations, when those working in the arts, and in particular those working at the interface of the humanities and the arts,
feel most intensely the alienation, the uncomfortableness of the language, the intensity of
the sense that the work to which one is devoting one’s life is not valued, that the arts are
the academic stepchild. Yet bearing the pain of that equivocal position, and the situations
that arise from it can yield much greater achievement, more and deeper moments of
delight--one finds one’s tumult in the clouds--and that is worth the cost.

For both airman and artist, the impulse remains pure, inviolate. It is a guide, a beacon, an
exemplar of what one is looking for or trying to achieve. The impulse also remains
individual, and at its core, lonely, in spite of one’s integration with and simultaneous
alienation from whatever institutional and social context one seeks out in order to follow
that impulse and pursue that delight. That impulse would be in that person no matter
where they found themselves, but might never have manifested, without that person
paying the cost of bringing themselves to the point where they find their tumult in the
clouds.

CONCLUSION: THE TRANSFORMATION OF THE LANGUAGE OF ART
EDUCATION

The discussion of the “why” of the title of the conference has brought us to the point
where I can address the transformation of the professional language of art educators that I
alluded to above. Let’s return to the idea that the question of the legitimacy of the arts
that I asserted above underlies the discussions of the conference. There is another general
question that permeates the discussions of what art school is for, or how it will maintain
and/or change its position in society. Where are art educators in this discussion? At the
center. After all, in that dictum of 1970’s feminism, “The personal is political.” But this
is effectively true only if one shares what is usually framed or conceived of as “personal,”
that is, symbolizes and communicates it, with an awareness of the political ramifications
of what is communicated.

Therefore, those tasked with the education of artists-in-training can transform the
language of the “study” of the arts by attempting to describe and evoke for their students
and their colleagues the experiences of their own lonely impulses of delight, followed to
their own tumults in the clouds, as they have manifested in art-making and teaching.
They must especially share the stories of their own delight in the shared pleasures of
teaching grounded in art practice and in teaching that is itself an art. Art educators need
to do that work to be in possession of their own experience of the emergence of their art
work and their teaching work, and of the language needed to articulate that experience to
the extent that it can be communicated, using both the language of art production and
practice and the language of study that they have had to take up as members of the
academy. That is, they need to appropriate the language under the hegemony of which
they have had to operate. It is through their own reflection and writing about their own
experiences as artists and as teachers that they can make the language they use entirely
their own, even as in its origins and in many of the contexts of its use in the academy it
remains foreign. Art educators can “populate” the semantic spaces of the language they
must use in art education with the stories of their own voyages in search of the delight
that matches their lonely impulses. To do this will contribute to the liberation of the
language that they use to describe what they are doing in the arts and in the academy. Only by making this language truly their own, and by clearly explaining the nature and practices of that language for their students, themselves, and the world at large—with a particular emphasis on their academic colleagues, can the arts even begin to shake off the epistemological stigma they suffer in the academy. The personal must be articulated as political.

Why do each of us study art in any sense of the term “study” that we might choose to use? Why do we attend to art as viewers, produce art in our own art practice, produce writings about or exhibitions of art? Ultimately, why are we here, and why do we feel, believe, think that playing the part each of us plays in our society is right for us? What is *the story* of our lonely impulse of delight, and of the path we have each taken to our own tumult in the clouds?

We need to answer the question that entitled this conference in relation to our personal connection to how we participate in the world of the arts. We need to remember, to explore in reflection and in our art production, why we profess art. If we spend the time to remember and discover the nature of our own “lonely impulse of delight” that drove to our own tumult in the art world, and we articulate that for the benefit of our students, it would, I believe, do a lot to help them to find their own paths, their own ways to follow their own lonely impulses wherever they might lead. We must not forget whatever impulse of delight that drives our art or scholarly practice, nor should we forget the need to communicate the fruits of our practices to others, through a teaching practice that has its own delights. It is up to us not to forget why we are here and why we do what we do. It is how we can claim and ultimately transform our language and make the language of our chosen field our own native speech, true to the traditions and the present moment of what we do.

We are all and each produced by our societal histories and conditions, as they play out in institutions. We are all and each “entrapped” by the language that we use. Yet we are individuals, each unique, and we can, by exploring and articulating our unique paths as participants in the social system of arts education, move ourselves, our students, our field forward toward a brighter future, as we discuss the ways that the institutions of which we are a part can adjust to emergent conditions. To truly clean the windows of the mind, our discussions of the social contexts in which we work must, I believe, be grounded in personal reflections regarding why we practice, profess, and, yes, study art.

As an art educator, I came to where I am by choosing one of Robert Frost’s divergent roads rather than the other. So, for me, the question posed for the start of the conference comes back to my personal experience of my professional path, and my ability to articulate that experience. It has to do with writing and talking about my experience of producing art and of producing texts in response to art, and seeking, in that process of articulation, the root reason, my own “lonely impulse to delight,” something I may never be capable of articulating, although I will die trying to. I believe that the basis of my teaching is to communicate my experience of my impulse and my delights. I seek to provide a space of practice and study where my students can get a sense of their own
impulses of delight. I seek to share with them stories of the means I have found for seeking out experiences that connect with and renew that impulse for me.

This paper, then, is, for me, why I ask why, why I believe we as art educators should ask why, and an articulation of where I think the answer lies for each and all of us.

**APPENDIX 1**
The School of Visual Arts 30th Annual National Conference on Liberal Arts and the Education of Artists, “Why Study Art?” October 12-14, 2016. Call for Papers:

**Why Study Art?**

Shrinking art budgets in K-12 and scandalous college debt from majoring in non-STEM disciplines confirm suspicions: the visual arts and their shabby cousins, the liberal arts, don’t merit the risk. A better plan is promoted by the savvy market economy: self-directed and distance learning offer radical—and affordable—alternatives. Students with initiative can blog and self-publish online and take online writing and drawing courses. If they are very persistent, they can read art history (psychology, sociology, history and literature), use inexpensive supplies and older versions of software programs, network at gallery openings and poetry readings and find mentors who are interested in their work—and not just in them.

But the truth is that most youth need guidance and structure, and art school offers tantalizing bright possibilities: an intellectual, creative and professional community; intense and exciting exchange of ideas; self-discovery and experimentation; knowledgeable and professional faculty; access to equipment and studio space; networking and internships; status; marketable degrees; a shortened learning curve; a time to grow up. Delight.

This conference will provide a forum to discuss the purpose and meaning of attending an art school: becoming an artist—painter, writer, illustrator, designer—in four years; the increasing academic and commercial focus of studies; the integration of the humanities in art programs; teaching practices (traditional vs. flipped classrooms or student-centered teaching); proliferation and micro-focusing of art disciplines; curricular standardization; the studio, scholarship and creative renewal. Suggested reading: “Critics Page” David Salle, Ed. *The Brooklyn Rail* (December 2015/January 2016).

–Maryhelen Hendricks, Ph.D., Conference Director
APPENDIX 2
Definitions of “study” n. and v.
I have marked in red those statements that in whole or part might be applied to the study of art in relation to the role of artist, for which the core symbolic product is the artifact or event that is termed “art.”

noun, plural studies.
1. application of the mind to the acquisition of knowledge, as by reading, investigation, or reflection: long hours of study.
2. the cultivation of a particular branch of learning, science, or art: the study of law.
3. Often, studies, a personal effort to gain knowledge: to pursue one's studies.
4. something studied or to be studied: Balzac's study was human nature.
5. research or a detailed examination and analysis of a subject, phenomenon, etc.: She made a study of the transistor market for her firm.
6. a written account of such research, examination, or analysis: He published a study of Milton’s poetry.
7. a well-defined, organized branch of learning or knowledge.

verb (used without object), studied, studying.
8. to apply oneself to the acquisition of knowledge, as by reading, investigation, or practice.
9. to apply oneself; endeavor.
10. to think deeply, reflect, or consider.
11. to take a course of study, as at a college. verb (used with object), studied, studying.
12. to apply oneself to acquiring a knowledge of (a subject).
13. to examine or investigate carefully and in detail: to study the political situation.
14. to observe attentively; scrutinize: to study a person's face.
15. to read carefully or intently: to study a book.
16. to endeavor to learn or memorize, as a part in a play.
17. to consider, as something to be achieved or devised.
18. to think out, as the result of careful consideration or devising.

BIBLIOGRAPHY

EMBODYING THE WORK: RESEARCH, ARTISTIC PROCESS, AND LEARNING

Rachel Delfuoco
Andrea Eis
Oakland University

ANDREA EIS:

Rachel Delfuoco and I are an undergraduate student and professor fellowship team, established through the Rosen Fellowship, a program created this past year at our university, Oakland University in Rochester, Michigan. Student and professor teams applied jointly for fellowships to work together on discipline-specific research projects for a one-year period. From the beginning, when the student-professor groups presented their projects in an early meeting of the Rosen Fellows, Rachel and I realized that we were working differently from other fellowship teams. Rather than doing research work collaboratively on a single project, Rachel and I were working individually, but in parallel, on our creative paths. We were exploring the same thematic, aesthetic and stylistic approaches in creating art films combining image and text, and specifically on how writing structures and filmic structures could reflect back on each other. However, instead of collaborating on the final product of our research, as perhaps scientists would, we collaborated on an exploration of processes that got us to our own individual final works. Our fellowship path turned out to be a learning experience not only for Rachel, but also for my own understanding of how to help a student navigate the creative process and for a reflective comprehension of how I myself navigate art making. Our art developed through a creative process that did not adhere to traditional research practice, but was nonetheless was still research – as an embodied process.

In the first part of this paper, I will present a brief discussion of the general concerns we faced in a research environment that does not really fit the creative process. In the second part of this paper, Rachel will present her fellowship research, process and results.

Throughout the fellowship period, a significant question hovering over our creative research grant turned out to be how we could engage in and validate artistic activity as “research,” in a research environment that is fundamentally antithetical to art. Rachel struggled with trying to write and make films while following a traditional research paradigm. We found that samples of collaborative work on the resource page for Rosen Fellows were not applicable to our experiences of artistic research as an embodied process. For example, some points from a resource article on RAD research emphasized for us the gap between the research processes of others (even those in the humanities) and those of artists.\(^1\) RAD is an acronym for Replicable, Aggregative, and Data-support.

Replicable methods – can be reproduced by other researchers
Replication of methods, and the expectation that these methods should be able to be precisely reproduced by others, does not work
for artists or artistic processes and creativity. Although some teaching methods include having students replicate the works of earlier artists, I find that antithetical to the explorative reality of the creative process. Even as a technical exercise, I do not view it as a valuable learning experience, because it tends to encourage a rote application of form and style rather than deepening students’ understanding of how form creates meaning.

**Aggregative results** – builds upon or extends previous research

Artists do sometimes follow an aggregative process, building on or extending previous artistic approaches. However, the history of art is also filled with the results of artistic explorations that do exactly the opposite.

**Data support** – leveraging data

Artists do not leverage data in their creative processes, in the sense of gaining advantage from gathering statistical information as background support for their research. Art is not developed out of or supported by an understanding of statistical evidence.

In preparation for this conference presentation, I decided to look into how an art school might talk about research, and chose, somewhat randomly, Tisch School of the Arts at NYU. Their research websites were promising, talking about encouraging radical experimentation, provocative collaboration, thoughtful reflection and praxis. I continued deeper into the Tisch website and was seriously disappointed by the advice I found in the NYU/Tisch page titled “Writing a successful grant proposal and detailed budget.” It contained the questions that should be answered, such as “What is the need for the project? Is it a serious problem or issue, or a lack of a needed service?” and “What are the facts and sources that back up the need for your project?” The final statement was supposed to “describe the status quo that exists before the solution to the problem, target a population group(s) and a geographic location, present the solution to the problem, describe the benefits to the target audience(s) and possibly to society at large.”

Is this what an artist has to prove to get a grant? And is this how an artist has to work once a grant has been awarded? Perhaps this advice was for a specific type of Tisch grant, and the website structure incorrectly suggesting its wider applicability. However, this is not an anomaly. In Michigan, state individual artist grants (which no longer exist as grants given directly to artists) at one point started focusing on turning artists into social workers, as you were required to develop a plan in your grant proposal for ‘serving’ underserved populations. While I do not object to this in theory, in practice it means that art will not be valued unless the artists ‘serve’ in ways that go beyond the creation of their art.

On the other hand, in this conference’s description of what an art school offers, Rachel and I found support for the art school’s development of community, idea exchange, and experimentation, and this became a spur for our proposal.
In the following portion of this paper, Rachel presents the path of her fellowship experience: the methods that she started with, in line with traditional research, and her return to embodied artistic activity – the active creative research that enriched and expanded her artistic learning experience and creativity.

**RACHEL DELFUOCO:**

The idea for my creative research project all started with a statement made by a peer in a fiction workshop class about how my writing was “cinematic.” It was something I had never noticed myself. I had never observed my processes or the relationships I had with my two chosen mediums of film and creative writing. Nor had I ever thought about how the two might overlap. So the goal for my Rosen Fellowship project, as stated in the initial application, was to “explore the creative process in which the two mediums feed off of each other; how words inspire images and images inspire words.” So I set off to do my research, to answer my question.

I began with the creative writing half of the project. And I came across a few interesting things:

In sitting down to write and simultaneously observe my process, I thought about how a story gets from my head onto paper. Essentially, it starts as a mental movie – complete with a mood, specific aesthetic, and editing conventions. Any story I write, then, is just my own coded film on paper. I even broke down my previous work by annotating and dissecting it, trying to piece out these “cinematic” conventions in word form.

In my fiction, I am very committed to establishing the mood through the imagery and setting, in having the environment and visuals inform how one feels toward the characters’ situation. And I try to accomplish that with the same principles I use when editing a film.
The process is all about carefully choosing the “shots” or very specific visual moments, and constructing them into a rhythm. And the goal is for that rhythm to lull one into the pace and feeling of the story. One sentence from the story particularly depicts a cinematic technique through the imagery of kicking a rock down a path. “I stopped and kicked a rock at my feet. I looked up. Dad was still walking. I kicked the rock again. And again. It tumbled away and I followed it off the path to where the squirrels scurried and shot up into the trees.” The sequence is broken up and edited like shots of a film into smaller fragments, smaller sentences, drawing out the action and helping to create a mood and the rhythm of the story.

So I had certainly achieved one of my research goals and found how my filmmaking process intersects with my writing one. I had found a hint at why my writing might be deemed cinematic, but what I could not do was actually write. The story that I tried to produce was very disjointed – just a series of snapshots placed one after the other almost like a poem, but there was certainly no beauty or rhythm. It was just as restricted as my process had become in my pursuit of “writing as filmmaking.” I had lost my ability to get into the mindset of a fluid, flowing story, because I got so caught up in the images.

The next step then, was to get into the filmmaking and (maybe coming from the difficulty I had had with the lack of flow in my writing) I wanted to explore movement.

I start the filmmaking process the same way I start my writing: with one moment, a specific feeling or place that informs the direction in which I go. And I think I succeeded in finding that moment, succeeded in getting started, but afterward is where the issue arose. I had my first interesting shot, but when I sat down to edit and piece a film together, I was stuck. Once again I was so caught up in how the piece would be able to portray this idea of filmmaking as writing or whether it would be successful, that I was pretty much setting myself up for failure – just as I had gotten distracted from the true goal in the writing exercise. So, once again, I discarded my research question and stopped trying to impose anything on this art that I was trying to create and I just made a film.
I had regular meetings with Professor Eis to talk about where the film was going, the process, and what the film achieved, much the way we would have done in class. But this way was more drawn out, an extended and closer look into the process of creating a film and all of its decisions. This allowed for much more of a focus on the progression from idea to completed film in a way that the typical class structure can skim over – particularly when you get caught up in moving from class project to class project, due date to due date. Our project had no due date and this allowed us ample time to devote to every aspect of the film; there was no necessity to settle on anything being “good enough” to submit for a grade.

The finished film, *County Line*, came about from this dedication to getting lost in the process itself and ended up teaching me much more about my “research” goal than my previous, structured plan ever could have. I ended up being able to stand back and look at the film once it was completed and observe how it related to my creative writing process. I learned from the work and the process itself, rather than feeling that I had to make my work fit into what I wanted to learn. And in learning from the work, embodying it, I was able to create with no self-constraints. This allowed me to not only make discoveries within the process, but also within the finished project that I had not mapped out or foreseen ahead of time.

So this research goal and the preoccupation with where I would end up had really disrupted my creativity. What was essentially my hypothesis became limiting. The idea that I held about how I imagined the process would unfold ended up tainting my approach to the work I was doing. In the midst of writing and making films I realized my process was no longer authentic, that I was trying to force these two things together that didn’t need to be forced together. I learned more by keeping them apart and simply allowing whatever would come about, come about. The ideas about how these two mediums were linked for me emerged more within the working process and allowing myself to go where that process led me, rather than my focus on coming to an already mapped-out result.
My initial research question had started to inform my creative decisions and, not surprisingly, I got stuck. Because in the arts it is the process, the act of creating, which brings about new discoveries and new creations, not laying out a plan and sticking to it. And certainly not asking a question and trying to get your work to be the answer you are looking for.

NOTES


NEVER FORGET

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Artists as cultural communicators. Artists who create beauty. Artists who create work to engage, and to question. Artists who use their voices to create political art that challenges. Artists who have worked alone and with collaborators. Artists who work with awareness in order to transform consciousness through art. Artists as witnesses. Artists who do NOT create beauty. Artists as warriors. Artists who change the world. Artists who Never Forget.

The artists, who have chosen to question, and to interpret difficult ideas, have been graphic voices as witnesses of atrocities committed against our own species and others who share this planet. Artists who have chosen, and those who will choose, to dislodge current thinking by questioning what has become acceptable or what is often hidden in the past or even unnoticed presently, are sometimes the only voice for those who cannot speak for themselves. Many living artists today have made conscious efforts to inform, with awareness by incorporating the themes of power, powerlessness, containment and oppression into their work.

In 1993, after eight years of research, Judy Chicago and her husband, photographer, Donald Woodman, premiered “The Holocaust Project: From Darkness Into Light” which incorporated painting, tapestry, stained glass and photography. In the book that followed, Holocaust Project, she wrote, “I wondered again whether art could really help in confronting the Holocaust so that its lessons could be applied. Perhaps the Nazis were afraid of modern art for a good reason. Visual art has the power to provide us with a way of facing aspects of reality that are too painful to approach except through the oblique path that art allows.”

Chicago comments her research had led her to the conclusion that it was essential to dehumanize human beings in order to “process” them:

I had learned that during the Industrial Revolution pigs were the first “things” on the assembly line. I began to wonder about the ethical distinction between processing pigs and doing the same thing to people defined as pigs. Many would argue that moral considerations do not have to be extended to animals, but this is just what the Nazis said about the Jews. Others argue, or believe subconsciously, that animals exist for human use. They assume that people are more important than other species and are horrified when human beings are treated like animals.
As philosopher Theodore Adorno, a German Jew forced into exile by the Nazis wrote, “Auschwitz begins wherever someone looks at a slaughterhouse and thinks: they’re only animals” (qtd. in Patterson, *Eternal Treblinka*, 53).³

Proving that the comic can shape cultural ideology, Art Spiegelman won a Pulitzer Prize in 1992 for his graphic novel, *Maus: A Survivor’s Tale*. Based primarily on interviews with his father, it is his account, in comic book style, using cats and mice as characters, of his parents’ experiences as Polish Jews in the Holocaust. He said that it was not until he left home that he realized “[. . .] that not everybody had parents who woke up screaming in the night.”⁴

*Maus* became two volumes; *Maus I, A Survivor’s Tale* and *Maus II: And Here My Troubles Began*. Spiegelman drew Jews as mice, the Nazis as cats, the Poles as pigs and the Americans as dogs. “By using these mask-like faces, where characters look more or less the same, a sketchier drawing style, I am able to focus one’s attention on the narrative while still telling it in comic strip form. So that distancing device actually brings one closer to the heart of the material than a true comix [sic] approach,” Spiegelman said.⁵

Spiegelman explained the original impetus for *Maus*:

At first, the genesis of that first-three page “Maus” strip was that I was asked to take part in an “Underground Comic” that Robert Crumb was part of, and a few other Underground cartoonists who were based in San Francisco were part of. The only editorial premise was one used anthropomorphized creatures rather than people. At first I wanted to do comic strips about black oppression in America using cats and mice. As I started I realized that this was a ridiculous thought in that I just didn’t know enough about the situation to be anything other than a liberal wimp with good intentions, but not enough underlying knowledge about the situation to do uhm [sic] any meaningful work. I realized that my own background included material of oppression which could be more directly applied.⁶

Echoing the comments of Judy Chicago, Spiegelman adds, “The rhetoric of the genocide that the Nazis used had to do with the extermination of vermin; it wasn’t murdering people, it was squashing parasites, lice, rats.”⁷
Sue Coe calls herself a Visual Journalist. Her web site is appropriately called “Graphic Witness.” Coe has researched and illustrated the marginalized; subjects such as slaughterhouses, factory farming, the subject of containment, the cruelty towards animals in entertainment, AIDS, prisons, apartheid and war – ugly things. Things we prefer to turn away from, and worse, ignore. Coe puts these images out into the world for all to see and to be imprinted by.

The intolerable treatment of animals raised for food and the slaughtering of those animals were the subjects for Coe’s work, Dead Meat, published in 1995 after six years of work. Coe viewed first hand slaughterhouses in the United States (to which she was allowed access) and documented that journey with her sketchbook and interviews of the workers and the managers of those facilities, those “killing floors.”

How does an artist convey the terror in innocent animals’ eyes before death, the sound of chain saws on still breathing bodies, the odor of blood and the jobs of the workers who wade in that blood and flesh every day? How does one stand there as fellow humans compound the horror by adding to the misery of these animals who have no federal laws to protect them? How does an artist convey the sordid reality?
Apparently, an artist’s sketchbook did not appear threatening, as in New York State at one slaughterhouse, the head slaughterer pointed the bolt pistol at Coe and said, “ ‘This is to kill artists, women and animals.’ ”

Coe’s motivation for her work is perhaps best summarized by her reaction to a passing cattle train made during a visit to Colorado, “The suffering of these animals is mute. For the defenseless, the gentle, the wounded, the ones who cannot speak, life consists of indescribable suffering.”

She described the conflicts she felt while recording the atrocities and inhumanity of the slaughterhouse.

[. . .] Every part of my being says to stop it, save them, which is impossible. I think of “art” and how I am going to draw it all. Will anything change when people see? This “art” thought comes so quickly after the failed rescue thought, as an attempt to comfort myself, like the idea of the “spirit” of the animal going on to another place. I feel sick and my legs are shaking—my hands too—I concentrate on acting “normal.” Various animals are killed. I look for a way out.

Later she stated, “The screams fall out of the air, as if they never existed.”

On yet another kill floor, she related the scene:

The door slowly closes. The older man grabs the front and back legs of a goat, swinging it to the ground. He pins the goat down by putting his boot on the other leg. The second goat watches and backs away as close to the closed door as possible. The younger man electrocutes the goat and then cuts its throat. The second goat cries like a child, she shakes. [. . .]The floor is covered with blood and I can see my reflection in it.
Coe further remarked,

The Holocaust keeps coming into my mind, which annoys the hell out of me. I see this reference in so many animal rights magazines. Is this the comfortable measuring rod by which all horrors are evaluated? My annoyance is exacerbated by the fact the suffering I am witnessing now cannot exist on its own, it has to fall into the hierarchy of a “lesser animal suffering.”

A downed animal is what the meat and dairy industries call an animal that is too sick, diseased or disabled to stand on its own. As there is no financial gain in euthanizing an animal that is suffering, that bellowing animal can be dragged by a chain, pushed by high pressure hoses, prodded electrically, fork lifted or hoisted to the kill floor. Others may be left to die on top of each other – however long it takes.

Coe described in detail the experience of one such downer:

The downer is too heavy to get up. She cries as a chain is attached to her leg, and a winch drags her along the ground to a truck. I can see her skin rubbing off, and her bones grinding into the pavement. I can see the white of exposed bone and blood. She can’t lift her head up, so her head, ear, and eye start to tear on the stone. I watch the man operating the winch, and he looks impatient. I start to think of school songs, so my eyes still see but my brain is occupied. At school, we sang those grinding religious ditties: “There is a green hill far away.”

As she reaches the truck, the cow rolls over, exposing her udders, which are full of milk. This is the total degradation of a life.

This great disconnect with sentient beings, and therefore, with ourselves, becomes clear when one examines the subject of containment and our obsession with exploitation of animals. Animals raised for food are not the only ones degraded and exploited. The public display industry which includes zoos, aquariums, dolphinariums and major theme parks has one focus – money.

The poster child for containment, animal abuse and one being who truly represents our disconnect to animals in the wild, is Tilikum, the orca imprisoned in SeaWorld, Florida. He has led an impoverished and compromised life of capture, containment and deprivation. His fate was sealed when he was kidnapped from his pod at two years of age in Iceland in 1983 while his family watched and waited for his release. His world that was once a predominately acoustic one of the sounds of the ocean and his family’s dialect, became a cement, metal, mechanical world with loud music, human applause, human feedings and medical attention that he would not naturally require, were he not in captivity.
Since then, he has served a thirty-three-year sentence deprived of natural socialization and his critical acoustical world. His dialect has been lost, as he has learned the mechanized sounds of the tank filters. Due to the grinding of his teeth against metal pool gates, his teeth have since been drilled so they can be irrigated with antiseptic solution. He has been bullied by other captive orcas to the point of bleeding. Instead has become a clown who entertains paying human guests in a marine park: no matter how he feels that day or even understands what he is doing or why. He has become a thirty-six-year-old, 12,000-pound criminal who never asked to be part of the human criminal world.

As he is a tremendous financial asset to Sea World as a stud, it is unlikely that his captors will ever release him back into the wild. What is likely is that he will live out his life in even more isolation eating and swimming in circles for humans’ amusement in SeaWorld’s cement bathtubs. Tilikum is a victim of a system that he never subscribed to, and unless he is returned to his pod, he has little or no future except a life of aloneness and degradation as a circus act, spending his time swimming in circles, floating and eating the food provided for him by his captors. His life as a mighty, self-sufficient hunter, a good son, and pacifist was never begun, yet it is we who dare to label him “killer.”

Scientist Ken Balcomb, the executive director of the Center for Whale Research, has been documenting the population and behavior of orcas in Puget Sound since 1976. “When you get born into the family, you are always in the family. You don’t have a house or a home that is your location,” says Balcomb. “The group is your home, and your whole identity is with your group.” Balcomb believes that most marine-park orcas can be taught enough to return to the wild if they are returned to their original family.

In the wild, orcas live in pods of 20 to 50 in a complex and highly social family managed by the females. The oldest is usually the matriarch who can live to over 80 years. The males can live to 60 years and never leave the mother. Separation is not an option. They communicate as to where the food is and share willingly. They will help an injured or sick family member stay on the surface to breathe. They have their own dialects and songs and make up new songs. Aggression is not common. In some populations of orcas, families stay within a four-kilometer radius of each other at all times. Dialects contribute to survival in the wild. What is learned and passed down generation to generation is silenced by captivity.

Motivated by Tilikum’s struggle, filmmaker Gabriela Cowperthwaite’s documentary “Blackfish,” released in 2013, dropped SeaWorld’s stock with a forceful blow after years of its abuse of wild animals. Time released figures in 2015 stating that the parent corporation faced an 84% drop in net second-quarter income, from $37.4 million in 2014 to $5.8 million in 2015. Revenue fell from $405.1 million to $391.6 million, a drop of 3%, in the second quarter of 2015 when compared to 2014. There were 100,000 fewer visitors than at the same time in 2014, a decrease of 2%. SeaWorld blamed ongoing “brand challenges.”

The greatest shows on earth, now known as the cruelest shows on earth, were run by
some of the greatest crooks and animal abusers on earth. Although historically, elephants have had a major presence in regards to the identity of the circus, their lives in reality are those of slaves. The philosophy of American trainers was based on use of fear and pain, and as much as possible to get the intended message across to break their spirits until the elephants gave out a cry of surrender. The cry was looked upon as a sign of success. Elephants never walked more than the distance from the train to the show grounds. They performed, were re-tethered and then reloaded onto the trains. History shows that the “trainers” were commonly male alcoholics who wandered into the circus grounds. Yet, many times, the elephants would try to bond with their “trainers.”

The abuse remained throughout the competitions for the best, biggest, circus by the owners and continued into the Barnum of today, including the separation of the babies from their mothers and “breaking” them, or breaking their spirits into submission for entertainment purposes. The circus elephant’s life is one of bull hooks, training that is not monitored, being chained most of the time, and traveling hundreds of miles by train which causes stereotypic behavior or road stress expressed by repetitively rocking back and forth, swinging the trunk, bobbing the head, and shuffling the feet. Up until 1879 Barnum used “the burning method” – hot pokers thrust into their trunks. Beatings continue to be a part of daily life today for circus animals and this has been filmed time and time again, as uploaded and available on YouTube.

Sue Coe illustrated the plights of elephants which included the largest elephant in captivity; Jumbo. He was born in 1860, stolen from Africa, brought to Italy, sold to a menagerie in Germany, then a dealer in Paris, then the London Zoo where he remained for 16 years. P. T. Barnum bought Jumbo in 1882. For a week, Jumbo refused to get into the crate bound for America, even lying down. His trainer Matthew (Scotty) Scott, who Jumbo was bonded to, finally convinced Jumbo after Scott had been threatened he would be fired if Jumbo did not cooperate.

Jumbo travelled for three years with Barnum’s “The Greatest Show on Earth,” and never received proper care. He could not eat his food because his teeth were worn out. He was
destined to die of starvation. Barnum made plans to have Jumbo preserved after his death by a taxidermist. He arranged everything while Jumbo was still alive — just in case.

Jumbo was 24 when he was killed on September 15, 1885, in the rail yards at St. Thomas, Ontario, Canada. The circus had just finished a performance. The elephants were being led along the main track in the rail yards to their boxcars. To their left was a steep bank; to their right was the circus train. An unscheduled freight train appeared. Jumbo ran down the track away from the oncoming train with his trainer Scotty beside him. The locomotive struck Jumbo from behind. He screamed in pain as the train carried him 300 feet down the track. He was wedged partly above and partly below a flatcar. A smaller elephant, Tom Thumb, was injured but survived. As he magnificent Jumbo lay dying, he reached for Scott’s hand with his trunk. Jumbo's skull was fractured in several places. He had serious internal injuries. Blood poured from his mouth and trunk. He died within minutes of the accident. Ever the opportunist, Barnum agreed to exhibit Jumbo’s remains at Ward's Natural Science Establishment in Rochester, New York.

Mary, an elephant born in 1894 was hanged in Erwin, Tennesee on Sept 13, 1916. She was part of Charlie Sparke’s “Sparke’s World Famous Shows Circus.” Mary was ridden by drifter Walter Eldridge down the main street during the arrival of the Circus in Kingsport, Tennessee. Eldridge had been with the circus one day. He had no experience handling elephants; but the only qualification required was the ability to wield an “elephant stick” — a rod with a sharp spear at one end, now known as a bull hook. (A bull hook has a sharp steel hook and a point at one end and is used to beat, hit, prod, and jab elephants into submission, sometimes until they’re bloody. Trainers often embed the hook in the soft tissue behind the ears, inside the ear or mouth, in and around the anus, and in tender spots under the chin and around the feet. Bull hooks were banned in California 2015.) Similar techniques would have been used to break Mary. But that day she was suffering from an abscessed tooth.

When she stopped during the parade to nibble on a piece of discarded watermelon rind, Eldridge jabbed her to keep her moving and hit the tender spot of the abscess. Mary immediately reached up with her trunk, threw him to the ground then crushed his head. A local blacksmith shot Mary with a pistol, unloading five rounds of ammunition to seemingly little effect. She stood still, suddenly calm again and seemingly oblivious both to the bullets and the citizens who encircled her with chants of “Kill the elephant, kill the elephant.”

Charlie Sparke decided that the only way to quickly resolve situation and to continue his revenue, was to kill the elephant in public. On the following day, on September 13, 1916, Mary was transported by rail to Erwin, Tennessee, where a crowd of over 2,500 people (including most of the town's children) assembled in the railroad yard. Mary was hung by the neck from a railcar-mounted industrial crane between four o'clock and five o'clock in the afternoon. The first attempt resulted in a snapped chain, causing her to fall and break her hip.

While Mary was dazed and in great pain, the winch was powered up again and this time she was raised high in the air, her thick legs thrashing and her agonized shrieks and
grunts audible even over the laughter and cheers of those watching below. Finally, she fell silent and hung there for half an hour before a local vet declared her dead. It was then determined that she had a severely infected tooth in the precise spot where Eldridge had prodded her. All because of her innocent desire for a watermelon rind.

*Topsy, or the “Elephant with the Crooked Tail,” was an Asian Elephant captured in India, Sri Lanka, Indochina or Indonesia in the mid 1870s. She was murdered in 1903 at age 28 at Coney Island.* Topsy’s crooked tail was due to beatings from the circus’ current owner, Adam Forepaugh. Topsy was named after a young slave girl in Harriet Beecher Stowe’s 1852 novel, Uncle Tom’s Cabin. The girl had been taken from her parents after birth so she had no recollection of her mother. “Grow’d like Topsy” became a popular expression in reference to growing at a remarkable rate without particular intent or plan.21 *Topsy the elephant did grow fast, and although having endured beatings on a regular basis, she was regarded as submissive and had become a star attraction.*

Although abuse was a daily part of Topsy’s life, in 1902 she suffered additional bullying by a drunken “circus follower” named James Blount. He teased her by offering her alcohol which she reached for, but he took away. He then threw sand in her face and finally poked his lit cigar into one of the most sensitive areas of an elephant, the tip of her trunk. She hoisted him up and crushed him when he came down. She was then placed in shackles but continued to be used for performances. Later, she again defended herself against an abuser, although not killing him. After that, the Forepaugh and Sells Brothers Circus decided to sell her to Sea Lion Park on Coney Island.22

She was led alone across the Brooklyn Bridge that day to her new life of further abuse.23 When Sea Lion Park was leased out at the end of the 1902 season, it was redeveloped into *Luna Park,* by publicity-hungry owners Frederick Thompson and Elmer Dundy. By now, Topsy had been involved in several well-publicized incidents, attributed to the actions of either her drunken handler, or others and was known as a “bad elephant.” She also cost more as she ate more.

Thompson and Dundy had decided their end-of-the-year plans would include hanging Topsy at the park in a public spectacle and charge admission. The ASPCA stepped in only to prevent viewers being charged. They did not prevent her murder. The method agreed upon was to strangle her with large ropes tied to a steam-powered *winch.* They also agreed they would use poisoning and electricity as well.

*Thomas Edison and some cronies began experimenting with animals, primarily unwanted dogs and cats, and then calves and horses by electrocuting them to prove AC was more dangerous than DC in 1887. They had even offered $25 per dog in Buffalo and were overwhelmed with offers. Larger animals for these experiments were desired. Electrocuting Topsy would allow the deadliness of a current to be demonstrated on the largest of land mammals, with the bonus of a it being a spectacular crowd pleaser.*24
One hundred photographers, a motion picture crew and 1,500 spectators arrived for the killing. Some paid 25 cents for a closer view. The Edison Manufacturing movie company who filmed the event released the electrocution part in order to be viewed in coin-operated kinetoscopes under the title. “Elephant.” The film is currently on YouTube. Topsy was led out of her pen into the newly named Luna Park’s construction site. She refused to cross the bridge over the lagoon, ignoring prodding and bribes of carrots and apples. Like Jumbo refusing to leave London, she knew something was amiss. They finally gave up trying to get her across the bridge and decided to “bring death to her.”

She was fed carrots laced with 460 grams of potassium cyanide which she played with and ate with no apparent ill effects. The steam engine, ropes, and the electrical lines were re-rigged to the spot where Topsy stood. The electricians attached copper-lined sandals connected to AC lines to Topsy's right forefoot and left hind foot so the charge would flow through her body. She raised her own foot obediently for the death sandal. She obeyed all commands from the men even to get down on her knees. A reporter commented, “Not so vicious.”

The switch was closed and 6,600 volts were sent through her body. Once her legs buckled and she began to fall, a donkey engine cinched the noose which had been tied around her neck for a full 10 minutes before she was pronounced dead. She had been poisoned, electrocuted and strangled – triply killed in front of an audience. The autopsy and skinning were done on the spot. Her heart and stomach were sent to Princeton’s Biology Department. Some of her hide was used for the Park’s creator, Frederick Thompson’s chair and two of her legs were made into umbrella holders. He would boast that it was actually Jumbo’s hide that decorated his office. Her head was buried behind the stables. Like Tilikum, she was literally lifted from her environment only having touched the Natural earth in her youth and then transported by boat over water to another place, a foreign place, away from her family, her dialect, and her freedom.

There are many, many other cases of elephants over the years: Romeo, Juliet, Dumbo, Tip, Dick, Chief, Bolivar, Jumbo II, Big Liz, and many more. All were slaves for amusement and profit. All of them suffered lives of degradation with only the value humans decided to place on them or not place on them, and all were held responsible for their actions in a world foreign and unnatural to them.

A recent discovery is that much of elephant language exists in a range that humans can not even hear. The deepest sounds we can hear, the grunts or rumbles, are the mild overtones of low frequency sound from 1 and 20 Hz, which is below the level of human hearing. Such sounds are so low and powerful they travel unhampered for miles through
forest, allowing elephants to send messages and warnings over long distances. The calls can enable elephants to reunite with friends and family members. One rumble means, “Hello, I’m here,” another, “Help, I’m lost!” They can also use low-frequency vocalizations to warn of predators. In Michael Daly’s book, *Topsy*, he wondered if Topsy may have used her contact call on the day of her execution saying, “Here I am, Here I am, Where are You?”

Maybe it is time or rather way past time, that we not only Never Forget, but that we learn to listen, to hear the voiceless, who speak under the oceans, through the forests and in the skies as some artists have chosen to speak for those who can not speak for themselves.

**Rest in Peace Tilikum January 6, 2017**

Rest, Rest. You are free. You are Home.

Patricia Denys

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**NOTES**

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The call for papers for this year’s SVA conference came on a day in June when I was computing averages of student course evaluations for my annual department evaluation, and after serving several terms on the Rank and Tenure Committee using numbers to determine whether young scholars were going to have careers or not, and at the close of a year as chair of the Envisioning Committee for a non-profit for which we administered (what else?) an on-line Likert-scale survey via Google forms which, at the touch of a button, gave me 30 pages of pie charts and bar graphs.

None of the statistical data or analysis told me things I did not somehow “know” before, but now I had some numbers so I “really” knew them. And I had an existential crisis. I thought, what do these numbers mean anyway, and why do we put such stock in them?

Data-driven decision making, data-driven assessment, and the reduction of what was once the intensely humanistic discipline of teaching to spreadsheets had proceeded apace until number crunching had become like a form of idol worship. Suffering a dark night of the soul in the middle of an early summer afternoon, I began to wonder just when we in the educational establishment had sucked the life and joy out of education. Was there a distinct moment or was it a gradual process?

And thus was born a word: datalatry. It simply popped into my head. There’s no point in looking it up. I could find no mention of datalatry or datalatry on Lexis-Nexis or in the OED, and I found no Google match. So I think my nonce coinage could be my personal contribution to the English lexicon, if it lasts, and I hope it does because the overweening worship of data is a reality in search of a name.

As we know from Thomas Kuhn’s notion of paradigms, all societies operate with basic tacit assumptions about the world. Alfred North Whitehead wrote that in every society there exist overarching paradigms that influence the ways we think within various sub-paradigms or universes of discourse. Whitehead wrote, “There will be some fundamental assumptions which adherents of the various systems within the epoch unconsciously presuppose. Such assumptions appear so obvious that people do not know what they are assuming because no other way of putting things has ever occurred to them.” The tacit assumption that statistical data should be the basis on which all decisions and evaluations are made has become our basic operating assumption, the bedrock of our mental hardware and our overarching value system, and we rarely question it.

In fact, of course, statistical analysis works quite well for many things, but our mistake is in thinking that it works quite well for ALL things and that ALL areas of human
endeavor are best planned for, operated by and evaluated by statistical means. This is datalatry.

This limited and limiting worldview has become especially pernicious in higher education, I believe, and nowhere does it do more damage than in the arts and humanities.

The traditional and broadly humanist purpose of higher education, to form well-rounded individuals who go on to become engaged citizens, has been replaced by a narrower definition in which the main, if not only, purpose of higher education is produce workers. In effect, all we ask of colleges and universities in our society is that they serve as vocational schools for white collar professions. The recent Government Scorecard for colleges and universities conducts cost/benefit analysis of school’s performances, in which the value of a college education is measured by the average income of graduates weighed against the monetary investment (cost) of their tuition. (See www.collegescorecard.ed.gov.) Gone missing in this too-simple analysis are qualitative factors and measures of assessment. The “value” of what we do as teachers in the arts and humanities is reduced to a simple dollar sign, and, as those of us in the arts know too well, our alumni starting salaries are not going to be as high as those of students in other areas.

Because of this too-simple statistical measure of educational “success,” however, the liberal arts, especially as they apply to General Education requirements within college curriculum, are regarded as luxuries or wastes of money. Simply put, the arts and liberal arts are not good investments. Consequently, students look at their liberal arts and arts requirements as things to “get out of the way,” an onerous and antiquated checklist that has no coherence and distracts from the real purpose of going to college. These societal attitudes percolate through institutions as demands to justify our disciplines in purely financial terms. How much money does the average English or history or language major make, and what is the marketplace demand for such majors? Where is the value added of forcing students to take art history or a humanities core?

Even those of us in the field have a hard time making a statistical case for the “value” of what we do because, from our points of view, the value of such study does not convert easily into metrics like dollars earned. In the case of professional school curriculum, such calculation is easier. Earn an accounting degree, become an accountant. Earn a finance degree, go into finance. Earn a nursing degree, become a nurse. Very few of our students, however, will become historians or poets, and this befuddles administrators—most of whom probably got degrees in higher education administration and thus became higher education administrators—and boards of trustees drawn from the world of business and finance. They just don’t “get” us, and we have a very hard time making our case. So we say stupid things like “The value of liberal arts is that we really teach critical thinking and communication skills,” which is true, of course, but beside the point. I mean, if what we really teach is critical thinking, then what is the point of the actual content of our disciplines? If the point of learning art history is to learn analytical
thinking and writing, then why not just design a course in critical thinking and writing and skip the Rococo gilt?

As I pondered all this in a spiral of increasing despair, I came to realize that the issue of “datalatry” was really a question of epistemology, of figuring out how we know and how we know that we know. The dominant post-Enlightenment model of knowledge (with roots going back to Pythagoras really) is that mathematics best expresses truth. But we in the field know that vast areas of arts and humanities deal in non-mathematical truths (intuitions, hunches, experiential knowledge and emotions) that elude quantification, and we have a hard time explaining this to the increasing number of people who have never experienced them and who want measurable outcomes.

These communication difficulties will only increase because we in higher education have divided into two tribes: the Quants and Quals, those who assess things using quantitative criteria and those who are more at home evaluating things qualitatively. Our problem? The Quants have been in the ascendency in the past twenty-five years are now mostly in charge. So, how do we Quals in the arts and humanities defend our fields to Quant admins and state legislators?

It will be a difficult sell, and the problem is exacerbated by a basic flaw in the datalatry paradigm, a dirty secret that is swept under the rug but that deep down everyone must acknowledge: no amount of data is sufficient, ever.

Take assessment, please. If there ever was a case of datalatry run amok, this is it. Once upon a time, student grades were considered a measure of student success in mastering the material of a course. Professors were considered adequate judges of whether students had learned the material. But then, somewhere around the same time as the emergence of a professional administrative class who had never set foot in a classroom, the higher education world began to question the validity of mere grades as measures of student outcomes and of professors as judges of whether those outcomes had been met. This begat course evaluations by students and observations by administrators, which in turn begat statistical course analysis. But wait? “How do we know your assessments are valid?” asked our regional accreditation bodies. “You must assess your assessments,” they decreed. And, lo, course assessment begat faculty senate assessment committees which report to a strange brood of vice presidents of institutional research, high priests really, whose lives are devoted to crunching numbers and making judgments on us from afar and calling us to account for the validity of what we do in numerical terms. And now we no longer question the validity of statistically evaluating what goes on in our institutions, and we by and large ignore qualitative criteria of success which provide only “soft” data.

The result deadens the joy of learning and teaching and replaces it with the false, clay-footed idol of data-driven planning and analysis, devoid of narrative, devoid of anecdote, devoid of subjectivity, humor and of anything else we might recognize as life. We practicing the arts and humanities know our fields are valuable, but we are failing to prove their value to those controlling collegiate purse strings, those high in the
administrative beanery who only see statistical spread sheets on how many credit hours
we are racking up and what our customer satisfaction rating is on a Likert scale.

So, what do we do?

First, I think, we have to begin with a bit of rhetorical jiu-jitsu. Let’s admit up front that,
yes, statistical analysis is one way to accumulate knowledge about the value of our
endeavors. That should throw them off. However, let’s also point out the obvious flaws in
that way of knowing. Anyone who’s taken a basic statistics course knows that the
knowledge you gain from statistical analysis is limited by many factors. Data received is
only as good as the questions asked, and data itself reveals nothing without nuanced
interpretation. Then we also have matters of margins of error, the dueling statistics we get
when we do two different surveys of the same groups, and finally the realization that
statistical analysis reveals some things but conceals others. Nothing speaks to the
weakness of statistical analysis better than the abysmal failure of so-called “big data” to
predict the outcome of the 2016 presidential election. For weeks prior to the election
virtually every poll in every major news outlet confidently predicted, on the basis of rigid
statistical analysis and aggregated poll data, that Hillary Clinton would be the next
president by a comfortable margin. As The New York Times explained it two days later,
November 8 “was a rough night for number crunchers. And for the faith that people in
every field—business, politics, sports and academia—have increasingly placed in the
power of data” (NYT. Nov 10 2016. Web). The big, abysmal failure of big, aggregated
data should open the door for us to advance our qualitative arguments about the value of
what we do and the way we talk about what we do.

Next, let’s lay a philosophical foundation for the value our fields, and let’s begin with our
society’s apparently attenuated understanding of what it means to be human. (After all, if
we are defending the humanities, we ought to have a good definition of the core of the
word.) John Stuart Mill, in “On the Definition of Political Economy” (1836), defined the
human being as, “a being who inevitably does that by which he may obtain the greatest
amount of necessaries, conveniences and luxuries, with the smallest quantity of labour
and physical self-denial with which they can be obtained.” I would argue Mill’s
definition is roughly equivalent to the definition of human underlying most of the debate
in higher education today.

As a definition of human existence, it is weak. It certainly covers much of what we
human beings do, but it is terribly reductive, viewing humans as solely economic
creatures. Using this definition of the ends and purposes of education and human
existence, those opposed to liberal arts education see little value in an area of study unless
it immediately furthers one’s purchasing or selling power. Thus, the College Scorecard.
Similarly, the value of a work of art becomes its monetary value on Sotheby’s auction
block; the value of history lies in how one may use it to avoid costly strategic mistakes in
the present, and so on. In the world created by homo economicus, everything and every
person becomes monetized, and human beings are of value to one another only in so far
as they may financially benefit one another. In society, we meet one another only at what
Thomas Carlyle in the 19th century called the “cash nexus,” in which every other human
is either a potential customer or potential rival.

There is, however, a well-developed and powerful counterargument, one that includes our
existence as creatures who must make our way in the world of economy, but one which
also envisions our existence as immeasurably richer and more complete than the
reductive label *homo economicus*. We find this argument traditionally in the arts and
humanities themselves.

One way to approach a more conceptual argument about the value of studying the arts
and humanities is to think of them as a body of knowledge and skills which are both
valuable in themselves and also of immense value as what philosopher Michael Polanyi
(1886-1964) called ‘tacit knowing,’” that is that which we know which enables us to
know. Unlike a specific learnable skill like accounting, knowledge of the humanities and
arts forms more of a gestalt against which other branches of learning and aspects of
human life stand out and are measured and experienced. Unlike the hard sciences, which
are best learned in a sequence proceeding from basic building block courses like 101,
102, 103, etc., the humanities and arts are notorious for being non-sequential. That is, as
former president of the MLA Gerald Graff pointed out, a student enters these fields like
going into a massive cocktail party that has been going on for a few thousand years,
spends some time trying to figure out what the conversation is about, then grabs hold of it
and joins in, gaining fluency and understanding over time. Knowledge in these fields
accumulates slowly, forms into a kind of web of literacies in one’s head, and seems
capable of infinite expansion. One can burrow down into a specialization in, say,
Venetian textiles, or can more generally see trends and patterns that may embrace
centuries. No one can master all of the disciplines, but even so, as Polanyi says, in the
end, “we know much more than we can say.” That is, we end up with a vast, mostly
invisible, body of “tacit knowledge” which “is the outcome of active shaping of
experience formed in the pursuit of knowledge. This shaping or integrating I hold to be
the great and indispensable tacit power by which all knowledge is discovered, and once
discovered, is held to be true” (6). Tacit knowledge is the worldview we bring to any
given problem or new area of knowledge. The key words here are “shaping” and
“integrating.” The tacit knowledge we accumulate over time becomes the lens through
which we habitually see the world. Like a telescope or microscope, it is that which
allows us to see something else even while it remains itself invisible. Polanyi writes, “…
In the act of tacit knowing we attend *from* something for attending *to* something else . . .”
(16).

This tacit knowing is holistic, paradigmatic, and is constantly being added to. It is,
however, non-specific and often not clear. In fact, in context of our discussion of
datalatry, it is important to point out that Polanyi, who was first a scientist, actually
distrusts too much clarity. He writes that “… an unbridled lucidity can destroy our
understanding of complex matters. Scrutinize closely the particulars of a comprehensive
entity and their meaning is effaced, our conception of the entity is destroyed” (18). We
might say that the tacit knowing we bring to any particular body of data is absolutely
necessary not so much for interpreting the data as for finding it “meaningful.”
Ultimately, this platform, or lens, of tacit learning from which or through which we view the world is learned by what Polanyi calls “indwelling,” spending a great deal of time just “living with” a subject. One example that comes to mind is how Lyndon Johnson’s biographer Robert Caro, in addition to his exhaustive research into LBJ’s papers and archives and correspondence, actually camped out beneath the stars on the land Johnson had grown up on to get the feel of the place which formed and informed the man. It would be difficult to draw a straight line between this activity and what he ended up putting in the biography, yet it gave him a tacit, intuitive and active understanding he could probably not articulate or quantify but which enabled him to write with deeper insight.

The areas the humanities and arts deal in—narrative, anecdote, illustration, experiential learning like field trips, song, dance and art—lead to an embodied learning transferrable to many other areas and life situations, but very little of it may be assessable quantitatively. Think of all that you learn when you learn to play a musical instrument. Not only do you learn to play a particular instrument more or less well, but you learn certain life skills not directly in the curriculum, as it were, things such as discipline, and how literally to “play with” other people. From musical theory you learn to be a flexible thinker, able to transpose not just keys, but patterns in any area of life. In addition, playing an instrument increases your emotional vocabulary, expressing yourself with passion or restraint depending on the piece. None of this would show up on a statistical analysis which might only measure if you’d played the right notes, yet anyone who thinks about it for a moment knows that these real life skills, in addition to the pleasure one gains from playing music, are among the life benefits of learning an instrument.

There is nothing new about this way of thinking. Two hundred years ago, in his “Defence of Poetry,” Percy Bysshe Shelley outlined the essential differences between analytic and poetic thinking. However, like many well-worn truths, we have forgotten the obvious. The analytic side of our mind sees quantities, emphasizes differences among things, and thinks mathematically and linearly, whereas the poetic or creative side is more likely to see qualities, similarities, nuances and shades of meaning. Without getting into questions of hemisphericity of the brain, we can at least agree that different styles of thinking do not exercise the entire brain at once. We see generalities and particulars, the process of analysis is different from the process of creation, and the emotional realm may be yet another part of the self which is not touched by certain kinds of analysis. Statistical analysis measures only the visible tip of iceberg of what goes on in learning.

Generally, when called on to defend ourselves, we in the arts and humanities fall back on two main lines of argument: the skills defense and the well-rounded defense. Both, I believe, are true but weak as they are usually presented. Let’s begin with the second first.

When admissions departments and general education planners talk about the arts and liberal arts—if they talk about them at all in these troubled times—they reflexively say that studying these areas makes students “well-rounded” by which they mean students learn a little this and a little that, as if they are going to an expensive educational salad
bar. This can be true if a school does not have a coherent philosophy of General Education and only requires a menu approach to the core and distribution, but the only monetary value most people can offer for this kind of education is that you will be able to watch *Jeopardy* and get more answers because of the breadth of your liberal arts learning.

There is, however, a more persuasive argument for liberal arts study by pre-professional and other majors, and it is rooted in the reality that in a complex world we all must be able to approach a wide variety of issues with at least enough knowledge to ask intelligent questions and to know how to solve problems outside our areas of professional expertise. To do this, one needs Polanyi’s tacit knowledge and that’s what we produce. Graduates who have had to master even introductory courses in several disciplines develop a wide repertoire of problem-solving skills, gain a rudimentary knowledge of several fields, and, as we always say, learn how to learn. This kind of flexible thinking and creative problem solving is actively encouraged in the arts and liberal arts. In addition, one is likely in these courses (think philosophy and literature) to encounter existential questions that do not normally come up in pre-professional programs. In the humanities, we are more likely to consider such questions as: human experience across time and space, ultimate goals vs. proximate goals, life questions vs. career questions, and dimensions of our lives that belong to our non-work selves.

In addition, we encourage asking the great questions like: What defines an age and generation? What virtues are needed? Why is there evil? What should we do about it? What is the meaning of death? What do we do with our freedom? What is beauty? And the list goes on endlessly. The answers to these questions and the ultimate impact of guiding students through discussions of these questions is difficult to measure numerically and the full significance of such classes may not become apparent to students until long after they graduate. These types of courses, these types of questions, ideally lead to many immeasurable outcomes, such as students learning to value learning for its own sake, the cultivation of intellectual “virtues” like curiosity, clear expression, logic, questioning/doubting. Finally, an old fashioned idea, contemplating the “great questions” may lead to character formation and a sense of “vocation” rather than expediency when it comes to choosing a career or life path. I suppose there is a way to put that all on a Likert scale, but I wouldn’t trust the results to be nuanced or complete.

If we must placate the bean counters and boards of trustees with measurable outcomes, I would bet there are plenty of studies out there that show that well-rounded individuals make better workers because they are fuller human beings with intangible, but real workplace skills including cross cultural understanding, adaptability, flexibility, creativity, imagination, wide knowledge base and the ability to answer new questions and learn new skills throughout the life span.

Finally, I would go so far as to argue that the arts and humanities are the indispensable transformative elements in the higher education of students. I’d like to refer you to Joel Mokyr’s book *The Gifts of Athena*. Mokyr is an economic historian who takes a close look at the relationship between what we might call “knowledge for its own sake” and practical inventions (like the steam engine, computer, etc.) that become the “technology”
of a particular period of time. The basic idea is that at any given moment of history, there is a certain body of knowledge held by a society as a whole (he calls it Omega knowledge). Some of it seems useful, much of it doesn’t, but it is there. As this body of knowledge gets expanded and shared, certain individuals get creative ideas for how to apply that knowledge in technical ways in the economy of a society (Mokyr calls it Lambda knowledge). Somehow Omega becomes Lambda. To put it in a concrete example, you can’t invent computers until you understand some basic science about electricity, materials conductivity, and pure mathematics. That is, without the sum of knowledge of such abstract—and apparently unpractical—areas of study as theoretical physics and abstract higher mathematics, you could not have profitable ventures like sponsored cat videos or Amazon.com. Mokyr doesn’t directly address how Omega knowledge becomes Lambda knowledge, but, as someone from literary studies, I would like to say that what enables us to move from abstract ideas to useful technology is the power of imagination, learning to combine two or more unlike things into a new combinations. A recent example: it’s been discovered that tobacco may be a medium for growing an anti-virus that promises to help combat Ebola in Africa. The creative thinking that helps transform abstract, often technical knowledge into new patterns and combination is precisely the kind of knowledge fostered by the fine arts and humanities.

How does it work? Who knows? Suffice it to say that Einstein played the violin, and his most productive “thought experiments” were highly imaginative, even childlike daydreaming about steam trains racing along a beam of light. Similarly, Freud, as a young man, had a desire to be a creative writer, and his understanding of narrative led to his theories of psychoanalysis.

I believe that future research in this area of how we foster imagination and innovative thinking is the key to our future survival in the datalatrous world of higher education in which we are trying to survive. We have many arguments in our favor. We just need to make them.

**BIBLIOGRAPHY**

STUDYING ART TO LEARN ABOUT SCIENCE

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My path to art is closely tied to my career in education. I began as a rather traditional biology teacher, but that didn’t last long. It couldn’t because I wasn’t teaching people who were interested in science. I was teaching, and still do, a biology course for nonscience majors, and they just weren’t interested in the things I was interested in: cells, protein synthesis, kidney function, etc. I had to find a way to bring biology to them, to their lives. So I broadened my viewpoint and ended up creating courses for criminal justice, sports management, and communications majors. While I was roaming far afield, I discovered art. This was in part because I married a historian with a background in art history. Going to a museum provided a cheap date, and I learned a great deal by seeing through his eyes. Paintings at the Metropolitan Museum of Art that I had viewed many times were revealed to me in a new way, as historical and cultural documents. I also began to see the biological content and context of paintings from Frans Post’s scenes of Brazil to Hans Arp’s biomorphic forms. I read Kenneth Clark’s (1956) *The Nude* in terms not only of art but also of the biology of the human body. Suddenly, the possibilities of biology broadened because it could enrich my appreciation of art and vice versa, as well as deepening my relationship with my husband.

I also developed an expertise in visual literacy that proved useful in helping my students understand biological diagrams. Biologists tend to be visual thinkers, attracted to the most visual of the sciences. They use many images in their teaching, but don’t always appreciate that many of these are not self-explanatory, that prior knowledge is necessary to understand the image and to appreciate all its content. I found that what I had learned about understanding art works was helpful in teaching about phylogenetic trees and other complex diagrams.

AESTHETICS

The next milestone for me was choosing a topic for my dissertation in science education. In preparation, I had to take a course I dreaded: Research Methods. However, the professor realized he had students from many different disciplines, so he gave us a wide range of examples, and most importantly a long bibliography. Among the books were a couple on aesthetics, a topic I knew nothing about except that it had something to do with art. Reading about aesthetics opened up another new world for me: the fact that you could think deeply about art the way philosophers of science think deeply about what it is to do science. A few months later, these two areas melded when I was browsing in the library and found Judith Wechsler’s (1978) *On Aesthetics in Science*. When I returned to the office, someone asked me what book I had, and I replied that I had found my dissertation topic, right there in that thin little volume.

Getting a doctorate was not quite that simple, but Wechsler’s book did contain essays by a number of people who were pillars of the field, and wonderful guides in my exploration of the aesthetics of biology. Among them were Cyril Stanley Smith, a metallurgist who...
became fascinated by the history of art, and Howard Gruber, a psychologist who wrote on “images of wide scope” such as Darwin’s tree sketch and its central place in Darwin’s thought. Wechsler’s book too had a generous bibliography that served as my road map, at least until I found the perfect adviser, Cecily Canon Selby, an MIT-trained physicist and electron microscopist who had become a science educator and policy expert. She was also mad about art and its links to science. I am grateful to her both for her guidance and her enthusiasm. She was only at NYU for a few years, but they were just the years I needed her.

After I got my doctorate, my husband and I began to do some research together. We basically did our own projects, but would from time to time collaborate on paper presentations. The first time we did this, we co-presented. As we were preparing, he asked me if I expected to talk, too. That’s when I knew this was not going to work. From then on, we often presented related, but distinct, papers as we did at this meeting a number of times. For example, Bob became interested in the visual aspects of the popularization of science in 19th century, so he wrote a paper on how Louis Pasteur was portrayed in the popular press, while I discussed the scientific side of Pasteur’s work. We also explored the landscapes of Frederic Church from the viewpoint of art and science. Without even realizing it, we were educating each other and broadening each other’s intellectual horizons.

When we were asked to contribute to a volume on women in the history of biology, Bob wrote an essay on Almira Hart Lincoln Phelps the educator and botanist (Hendrick, 1995), while I worked on the botanist Agnes Arber whom I had first encountered in my research on aesthetics. She wrote *The Mind and the Eye* (1954) on the philosophy of biology from the viewpoint of someone with an interest in art. Arber was trained by her artist-father and did all her own illustrations. She also wrote a book on the history of the first printed herbals that became a classic (Arber, 1912). Her enthusiasm for her work comes through clearly in her writing, as does the depth of her knowledge. This encounter with Arber has turned into a long-term relationship and I have written about her several times over the years (Flannery, 2005).

**DRAWING**

Arber was someone who seamlessly moved among botany, art, philosophy, and history. She became my role model. I even eventually took botanical illustration lessons. After my husband died, I needed to find new paths. I had considered art lessons from time to time, but never seemed to follow through. A friend told me about classes at New York Botanical Garden (NYBG) and I took the plunge. The curriculum there was very classical. The first course was mostly about shading and form; we hardly drew any botanical material at all. Accuracy was the focus: if the plant were not portrayed correctly, how would you know its species? A wrong twist of a petal could be disastrous. There were hours of homework, and I found the discipline of it engaging. I kept at it and eventually finished all the coursework for a certificate in botanical illustration, but the required portfolio was another matter. I didn’t get a passing grade, and didn’t attempt a do-over.
No matter the outcome, I learned a great deal from the experience. I still do some drawing, which I enjoy, but what the art classes taught me was how to see. It is a truism that you don’t really look until you have a pencil in your hand. Because I saw so much by looking at plants, I became more interested in them and in the botanical art that has so enriched the science of botany over the centuries. NYBG is a wonderful place to study because of its impressive library and archives. For class, we saw Otto Brunfels’s (1530) and Leonhart Fuchs’s (1542) herbals that Arber had written about—also the work of Georg Ehret, Franz and Ferdinand Bauer, and such 20th-century legends as Margaret Mees. Flora Illustrata now provides a wonderful point of entry into the NYBG collection (Fraser & Sellers, 2014).

Taking illustration courses also made me a better teacher. Being a C student was a good experience for me (Flannery, 2008). It taught me to be more patient with those who didn’t get things the first time, or even the second. It also made me appreciate that there is no substitute for work and concentration in learning. Seriously doing art for the first time in my life was humbling, disorienting, and terribly enriching. It also led me into new areas of biology. While I had been interested in art and aesthetics in relation to biology for years, now that I had some experience in observing and drawing, I could appreciate James Elkins’s point that art historians should practice art, should know what it is to make all the decisions that go into making marks and forms, all the layers of skill and personality involved (http://www.jameselkins.com/images/stories/jamese/pdfs/A-h-should-draw.pdf).

Recently, my interest in this interface led me to Omar Nasim’s (2013) Observing by Hand on the crucial role drawing played in the development of the concept of nebulae in astronomy. Nasim argues that the drawings of nebulae by astronomers including John Herschel created the concept of the nebula. In drawing these faint, difficult to see and to record clouds in the night sky, observers gave nebulae form and structure: without the art there would be no science here. Nasim also cites the work of Barbara Wittmann (2013) on the drawings for an article on a new species of fish. In the process of creating these images, the artist found it necessary to investigate how the nose hole or nares connected to the mouth beneath the surface. In doing so, he discovered something new about its structure. Art again led to science. This work brought me back to Agnes Arber and her botanical illustrations. Her drawings were not an adjunct to her scientific work, something she did because she couldn’t afford to pay an artist (though she couldn’t), but rather an intrinsic part of her scientific practice. For Arber, observing, drawing, and thinking were all seamlessly woven together.

**HERBARIA**

About six years ago, I was love-struck. Not by a particularly handsome man—somehow my late husband seems to have engineered against that—but rather by a herbarium, a collection of pressed plant specimens. This may seem like an odd object of desire, but I did indeed become smitten. I was attending a conference in Providence, Rhode Island and went on a tour of the Roger Williams Natural History Museum where we were shown the
storage rooms with cabinets filled with stuffed animals, rock specimens, and 6000 pressed plants. This collection is like a time capsule, most of it dates from the late 19th and early 20th centuries. Among the items in the herbarium were albums with beautifully pressed seaweed specimens, something I never recall seeing before, but now know are quite common. Those plants gripped me, and I began reading up on herbaria. The more I learned, the more deeply I fell in love and have remained in that state ever since.

I think one of the reasons that I’ve become so involved in this subject is that it intimately involves art and science. There is a definite aesthetic element in the mounting of specimens, and even though most of the plants have turned shades of brown, they are still very pleasing to the eye. Also, many botanical illustrations are made from herbarium specimens, and there is a real art to creating a representation showing the 3-dimensional form of a plant using a 2-dimensional model. This exploration has also drawn me to the work of botanists like Arber who create their own illustrations including William Hooker and Joseph Dalton Hooker, William Henry Harvey, John Henslow, and Arthur Church. I’ve also investigated long-term working relationships between artists and botanists: Franz Bauer and Robert Brown, Sarah Drake and John Lindley, Asa Gray and Isaac Sprague. In many of these cases, the final work was a collaboration between the two, which is why they excel in both accuracy and aesthetic appeal.

At the moment, I’m studying collaborations between contemporary artists and herbaria, a number of which have had artists in residence. The noted British painter Victoria Crowe worked at the Cambridge University Herbarium when she became fascinated with specimens while painting the portrait of a Cambridge botanist, David S. Ingram (Macmillan, 2013). She was taken with the way specimens, particularly of irises and lilies reflect two of the main themes in her work, fragility and timelessness. She used her drawings of these plants in multimedia works for her exhibit Plant Memory (Crowe & Ingram, 2007). One of the drawings, of an iris, is the best herbarium-based watercolor I’ve encountered. She has drawn what she saw, not trying to reconstruct it in three dimensions, and in taking this approach has created something that does indeed epitomize fragility and timelessness.

The herbarium at the Royal Botanic Gardens, Kew was the site for a massive student project. Created by Rachel Pedder-Smith as part of her doctoral project at the Royal College of Art in London, this huge botanical illustration depicts 703 specimens from 505 families. (Pedder-Smith, 2011). The watercolors are arranged on seven large sheets of paper, and when placed end-to-end, the painting measures 18 feet long. The work, called Herbarium Specimen Painting, required 766 days of painting, with an average of seven hours work a day. Pedder-Smith chose to use herbarium specimens rather than living material because she wanted to interweave history into the work. Many of the specimens were collected by important names in botany including Joseph Banks, Charles Darwin, and Joseph Dalton Hooker. There is also history included in the arrangement, which uses the latest taxonomic classification based on DNA evidence and thus on evolutionary history. It is an exquisite blend of art and science.
In a show on artist’s books and the natural world at the Yale Center for British Art (Fairman, 2014), there was piece by Jane Hyslop who has done research in the herbarium at the Royal Botanic Garden Edinburgh. Her process is particularly painstaking, and a metaphorical combination of botanical illustration and specimen preparation. She created a “paper herbarium” by collecting plants from her local area and making etchings of them, somewhat as a botanist collects specimens and flattens them on paper. Then she cut out the etchings and pasted them on herbarium sheets, with labels giving the names of the species and the collector, as well as the collection date and locale. This is reminiscent of the notebooks of Felix Platter, the early modern botanist who cut out the Hans Weiditz watercolors that were used to make the woodcuts in Otto Brunfels’s herbal (https://platter.burgerbib.ch/geschichte/abbildungen). Hyslop’s work is also a commentary on the disappearance of so many plant species, with herbarium specimens being the only tangible record of their existence. In the future, all we can do is reproduce them in works of art. I’ll end with this example, though my herbarium mania could keep me going for some time.

CONCLUSION

What I have described here is one biologist’s journey into art, not to the exclusion of science but in concert with it. Art has enriched my science, my teaching and my life. I would like to note, as I spoke about in my talk here last year, I now teach a course on evolution and art (Flannery, 2015). It is a core science course, so I am doing what I have always done—teaching the biologically unengaged—but I am now doing it in a way that I have never been able to do it before. The parts of my life are coming together, and it is fitting that this is the last Liberal Arts Conference, because it is also my last year of teaching. And while I am leaving the classroom, I am taking my love of botany and art with me and hope to be actively involved in both for some time to come.

REFERENCES


THE ART STUDIO INTERFACE OF PHYSICAL INSTRUCTION IN THE WAKE OF THE DIGITAL WORLD: WHY IT IS STILL IMPORTANT TO PHYSICALLY ENGAGE STUDENTS IN THE RIGORS OF STUDIO INSTRUCTION

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Visual art, with the interface of professorial direction, has a remarkable role to play in directing students in the studio environment. It is here they engage eye, hand, mind and time. Students need to see professorial demonstrations of materials and techniques. These first appear to be lucid in cyberspace, but lose that certain substance which makes us human, i.e., the mistake making process. It has been said that great artists make their mistakes work for them. I have taught this in many teaching scenarios including ground and online art classes. Each one has its unique forum suited to the student and their respective degree pursuits. When young students enroll in college and university they expect to be steered. This present digital world absorbs their attention and pulls them in many directions. Art has the ability of centering one. When a project is introduced and demonstrated, the student(s) are immersed in the project to become one in a universe of their own construction. Concepts/ Ideas are presented by the professor. Materials and techniques are demonstrated. Past student work is shared to embolden the student that they can create similar work via trial and error. Individual abilities are integrated in project completion. This process captures individual inspiration. This I will share in terms of student work in a slide presentation.

Students need us. Our virtual world seems to imply that little or no human agency is required. This is false security which has extended into the academy. I am not a luddite. I use technology all of the time in the classroom as there are many great tools available. Student ages can range from 18-on. The younger students require professorial leadership which can only come through physical engagement. I enjoy sharing my personal experiences as a student as well as a professor. Art making is compelling, but also frustrating for studio art majors and, truly, for non-majors. All students need steerage. In fact, they want it. Physical demonstrations especially by professors are without question a needed resource:

View video of me drawing in front of my students:
https://www.youtube.com/watch?v=7orZW0c26lc&feature=em-upload_owner

As you can see the drawing I student’s are looking attentively at this short but direct demo on perspective gesture drawing. I urge them to draw what they see rather than what they think they see. During the Renaissance period in both the North and Southern Europe, we all know that young artists learned by doing! From designing a small broche or painting a massive altarpiece was equally engaging an undertaking for these artists working under the tutelage of a master. In essence, the bottega was then, what our
undergraduate college or university art school is now. The studio was a place of contemplation frequently housed in the same building as a place of learning.

Our contemporary studio model can be traced back to the Renaissance, when private patrons supplanted the centralized infrastructure of the Church that had dominated the production of art in the Middle Ages, when artists worked within monasteries or similar religious institutions. In this new era, artists began developing close and long-lasting relationship with individual patrons, for whom they would create commissioned work for many years, painting altarpieces, murals, portraits of their patrons' household, and other commissioned projects.

The artist's very livelihood became dependent on their patron's beneficence, and the reputation of one was tightly intertwined with the relationship of the other. The artist's work was carried out in the bottega, the workroom, as opposed to the studiolo, a word that has the sense of a study, a room for contemplation, which would be a separate space. Both were often housed in the same building. Artists entered as apprentices, doing menial tasks until they proved themselves talented enough to learn the art of their masters. Contemporary upper level undergraduate students as well as graduate students pursuing an MFA, one can say work in a solo bottega, whereby, workshop and study have become one. The professor works along with the student to set some parameters on work to be completed. Creative work, once completed, is examined by the student, professor and other students during the critique process.

The fine art studio interface is a mutually gratifying experience occurring in various bottega-studio environments including, but not limited to drawing, painting, sculpture, printmaking, ceramics and mixed media. It is here that undergraduate art professors share their respective expertise in providing the following:

- An explanation of the assignment/project
- Handouts
- Demonstrations of what they hope students will be able to follow lets say in examining linear perspective or other traditional topics
- Student work will be examined by the professor while the student works (my technique is to lecture while they work)
- In progress work may be examined by the class to see individual creative processes at large and at work
- Finally the group verbal critique along with a written check/guide sheet helps students to gauge criticism in a pointed and productive way. When students become used to the critique process, they are more verbal in subsequent ones.

Is the studio interface still relevant today in the midst of our digital revolution? I think so. One definition of interface is: Interact with (another system, person, organization, etc.)

"His goal is to get people interfacing with each other"
This too is my goal: To engage and interact amongst all persons who experience the act of producing creative art forms.
THE VIRTUAL FLÂNEUR: THE ART OF WALKING IN CYBERSPACES

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Teaching writing and literature to students at a school of art and design, business, and technology that has neither a major in English nor in literature, I grew to expect that many students—in their discussions of writing and literature—would frequently compare written works to film or TV (“this reminds me of Fight Club or Twilight or that scene from Gossip Girl”); more recently, students’ points of comparison have included video games (“this reminds me of Final Fantasy or Devil May Cry or that scene from Grand Theft Auto) as a common canon of knowledge from which to speak about storytelling. So, prompted by students, I began to think about opportunities for using video games in the classroom, as a means to build on what students already know and to encourage them to look at the media form more critically.

For teaching purposes, I’m particularly drawn to open-world games featuring “emergent gameplay,” which are games where players are presented with a relatively open-world experience, whether they be single-player games or cooperative MMORPGs (Massive Multiplayer Online Role-Playing Games). In emergent games, challenges are completed in an order determined by the player, play is mediated by player customization and player goals, and much more player choice and freedom exists. By contrast, “progressive games” are games where challenges are offered and completed in serial order, play is mediated by narrative and games mechanics, and much less player choice and freedom exists (Juul, “The Open and the Closed” 324-326). Emergent play is a lot like our daily lives; instead of fulfilling a preconceived storyline, players are confronted with the question of “How will I spend my time?” In games spaces, this might take the form of battling creatures, establishing friendships with other players, collecting materials to craft a more powerful weapon or tool, or finding loopholes in the game mechanics to cheat the system.

GAMING AS WALKING

Part of the possibility of emergent gameplay is “walking” itself, or in a larger sense, exploration of the game space and the spectacle presented to the player. Having the time, means, and leisure to explore conjures up the image of the 19th century flâneur, setting his own course and rambling the streets and arcades of Paris. In “The Painter of Modern Life,” Baudelaire describes him as “the passionate spectator,” one who can “be away from home and yet…feel oneself at home and to feel oneself everywhere at home” (Baudelaire 9). Writing on Baudelaire, Walter Benjamin notes that the flâneur also “play[s] detective,” with “strolling giv[ing] him the best prospect of doing so” (Benjamin, Charles Baudelaire 40). This dual role of spectator-detective embodies well the experience of any player moving into a virtual game space, tasked with enjoying the experience offered by the game and also working to understand the challenge afforded by any game’s world ethos and game mechanics. Virtual walking challenges the notion of
the 19th century flâneur, however, in that it erases the sense of gender and class privilege typically associated with the 19th century man about town. For Baudelaire, there was no flâneuse, as historically “women lacked access to the city streets that their male counterparts took for granted” (Scholes). A quick look at some demographics from the Entertainment Software Association of who’s playing video games these days shows not only their ubiquity but their parity:

- 97% of youth play computer and video games
- 69% of all heads of households play computer and video games
- 44% of all gamers are women
- 27% of all gamers are over the age of 50 (“2015 Essential Facts”)

The journal Cyberpsychology, Behavior, and Social Networking cited in Jane McGonigal’s Reality Is Broken: Why Games Make US Better and How They Game Change the World also notes that 61% of surveyed CEOs, CFOs, and senior execs take daily game breaks at work, casting aside the stereotypical notion that video games are for young, unambitious time-wasters, and suggesting instead alternative roles for gameplay in daily lives (11). The omnipresence of affordable digital devices—from smart phones, to tablets, to laptops—has also played a significant role in granting access across class lines, so that the “streets” of virtual world gaming are more representative of and populated by contemporary pluralism. So if access to who’s playing games has become more widespread and democratic, what might virtual walking offer students in the liberal arts classroom?

**ELEGY FOR A DEAD WORLD**

One of several more recent examples that highlight the increasing possibility and range of video games for educational purposes is 2014’s Elegy for a Dead World developed by Dejobaan Games. In Elegy for a Dead World, players enter the game as a jetpack-wearing cosmic explorer, shifting between three separate planets inspired by Romantic poets and their poetry: Lord Byron and “Darkness,” John Keats and “When I Have Fears That I May Cease to Be,” and Percy Shelley and “Ozymandias.” Each world is beautifully swathed in a color palette of its own, the septic gold of an industrialized wasteland, the rust of an over-sourced terrain devoid of life, or the once-regal magenta in a land of monoliths honoring a forgotten past.
Within each world, various roles present themselves depending on player choice, and as players move through the world, a quilled pen option appears at the bottom of the landscape, offering players the opportunity to write the dead world into being, either through testimonies left by those in the last days of the dying world or the pieced-together history from the present-time visitor making sense of what was lost (Kunzelman). While walking calls the world into visual existence, the writing that players create during this game—products of the players’ imaginations—can be uploaded to the web and shared with the player community. Baudelaire’s spectator-detective is key to gameplay in *Elegy for a Dead World*, for the player both bears witness and uncovers this history of the landscapes scrolling before her or his eyes.

*Elegy for a Dead World* has special appeal to classes that focus on the Romantic period or Romantic poets, writing, and language-learning skills, even ESL practice, and soon after its release, it showed a positive response with “more than two hundred” educational institutions using it in classrooms and connected to assignments (Isokawa). Although some of its mechanics are restrictive and make the community aspect of sharing writing difficult to navigate, the game itself serves as a promising example of where games are headed, integrating designer vision and gamer agency in mutual creation of the play space.

**NO MAN’S SKY**

The flâneur as observer-detective is also the essence of this year’s much anticipated *No Man’s Sky* developed by Hello Games for PlayStation and Microsoft game systems. In *No Man’s Sky*, the flâneuse or flâneur truly creates her or his own path in this sandbox
game, where play is determined completely by player choice, devoid of the “rails” of game-dictated narrative (Sims). Players begin at different points in an “infinite procedurally generated galaxy” (Webber), collecting resources to repair a downed ship in order to travel between planets and, eventually, star systems. As players advance, the universe of the game continues to build itself and expand by algorithm, so that generated planets offer players the opportunity to discover them for the first time, by any player in the game. Each generated planet exhibits its own environment and geography, some with dangerously high levels of heat or toxicity, others with flora and fauna, and all with a variety of sentinel drones charged with protecting each planet’s ecosystem. The pleasure of *No Man’s Sky* lies in the discomfort of newness, not only the slow learning of the game’s mechanics and the technologies at the player’s disposal, but in the promise of seeing that which has not been seen before: landscapes toned in a variety of colors, creatures that resemble odd recombinations of those we might know on earth, and a host of resource-bearing outcroppings and biomatter that shift planet to planet.

![Screenshot: No Man’s Sky (2016) by Hello Games](image)

Returning to Baudelaire’s notion of the flâneur: “He is an ‘I’ with an insatiable appetite for the ‘non-I,’ at every instant rendering it and explaining it in pictures more living than life itself” (Baudelaire 9). *No Man’s Sky* places the player firmly in the position of a galaxy’s first explorer, and part of the thrill of playing it lies in “rendering it and explaining it in pictures” in a sense. Once planets are discovered, players can name them, and points of interest across each planet’s surface, these new “discoveries” uploaded so that other players might stumble across geographies branded by other players. New species are identified, languages with other humanoid species are learned painstaking word by painstaking word, and as is true of most ambling tourists, the impulse to capture one’s experience and share it photographically with others—through the virtue of screenshots—documents time spent in the game with records of visited worlds.
No doubt players will develop affinity for certain planets, land features, outposts, and space stations, but the ever-expanding nature of *No Man’s Sky* makes it doubtful that a player will return to any star system once left behind (Webber). The promise of newness and the beckoning sky seem to be the game’s “rules.” Consider, though, the value of *No Man’s Sky* to a student writing a creative travelogue or practicing the habits of ethnography or fostering descriptive skills by describing what hasn’t yet been known or named.

**POKÉMON GO**

At the time when I submitted the abstract for this paper in May of 2016, I couldn’t have anticipated the cultural walking phenomena, *Pokémon Go* created by Niantic, Inc., released in July 2016. Unlike the virtual world games I’ve noted, *Pokémon Go* maps virtual elements over our everyday world and sends players in search of Japanese pocket monsters known widely from manga, TV, and film. In essence, the virtual flâneur returns to its origins, the virtual world and the real world becoming one. Similar to childhood scavenger hunts, *Pokémon Go* builds on a tradition of “geocaching” (Bhasin) where players seek out specified areas in search of rare Pokémon, captured with a PokéBall and trained in communal open-spaces called “gyms” where players compete against other Pokémon trainers.

Despite the mobs of would-be Pokémon trainers who blocked traffic and trespassed on private property in search of rare Pokémon, one of the upsides of the *Pokémon Go* flâneur is an increased awareness of the environs in which one lives, for as trainers move around any neighborhood, PokéStops appear with points of information about local landmarks.
some that may have gone unnoticed and unknown prior to playing the game. Like the space tourist of No Man’s Sky, the Pokémon Go trainer is armed with a camera to capture and document sightings of rare creatures (Hughes), whether images and videos of Bulbasaur, Pikachu, or Charmeleon, or player selfies with the sighted monsters, with Pokémon sometimes appearing in the strangest of places. No surprise, schools have already embraced the fascination of players with Pokémon Go, from classes in app development, to classes in physical education using Pokémon Go as the carrot to jumpstart exercise (Glum).

APPLICATIONS FOR TEACHING

Applications for teaching depend on the virtual world and the academic discipline, for sure, but if video games represent a medium that many students already feel comfortable exploring, they afford students opportunities to leap from games to other texts, to draw connections, and to realize that looking at the world critically doesn’t only apply to texts produced before they were born. Since virtual worlds—like any speculative world—often reflect the ideas, issues, and tensions of our own, they can offer opportunities for student engagement in the classroom or at home, whether approached as required assignments or as optional add-ons. Some possibilities include a virtual travelogue or ethnography; creative language practice; exploration of historical, literary, and art historical allusion; narrative, intertextual, and transmedial study; and application of moral philosophy and social theory. In the way that literature and other arts awaken us to real-life experience, video games and virtual worlds promise to offer us another window into the intellectual and emotional worlds students might inhabit as well.

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THE RELEVANCE OF ART

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“Any idea that ignores the necessary role of intelligence in production of works of art is based upon identification of thinking with use of one special kind of material, verbal signs and words. To think effectively in terms of relations of qualities is as severe a demand upon thought as to think in terms of symbols, verbal and mathematical. Indeed, since words are easily manipulated in mechanical ways, the production of a work of genuine art probably demands more intelligence than does most of the so-called thinking that goes on among those who pride themselves on being “intellectuals.” [Dewey, 1934, P. 47]

John Dewey was invited to deliver a series of William James Lectures on The Philosophy of Art at Harvard University, in the early 1930’s, which form the basis of his book *Art as Experience*, and from which the above quote is taken to help set the stage for an inquiry into the relevance of art.

Dewey wants the students, to whom he is lecturing, to know that the work of the artist and the scientist are of equal importance to society. Through their work they provide us with a necessary understanding of human beings and their environments. To grasp the way each think an outline is provided using information from *Art as Experience*. 
Highlighting the work of the Artist and Scientist According To Dewey

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The materials used by artists and those used by Scientists differ in kind, but are comparable in the rigor of thinking that goes into their respective production of excellence. For example, artists think in terms of qualities, color, tone, image, line, word, dancing body, wood, etc. Scientists think in terms of symbols: verbal and mathematical. While the artist expresses meaning, the scientist states meaning. The artist will emphasize the aesthetic, the scientist will emphasize the intellectual. They are comparable: Artist and Scientist. Yet they function differently. (Dewey, 1934)

“John Dewey once commented that the stamp of the aesthetic needed to be on any intellectual idea in order for that idea to be complete.” (Eisner, 2002 P.199)

In 2012, 850 million people visited museums in the United States. This exceeded the combine total of attendees at sports and theme parks for that year. New York City’s Metropolitan Museum of Art can claim 6 million of those visitors. In Paris, the same year, the Louvre had 10 million visitors. Among those countries who had over 100 million visitors were: Germany, 109 million; China, 500 million; and Japan, 161 million. In the Gulf Region museums are planned for Qatar and Abu Dhabi to encourage tourism. The public enjoys going to museums and more museums are being built to accommodate this enthusiasm. [Fiammetta, 2013, P. 3-4] No doubt museums are of interest to the general public in high numbers. These masterful human accomplishments gathered from the dawn of civilization, created by a global few, on display within the secured portals of museums have captured the attention of a viewing public.

Our difficulty in conveying this relevance of Art to our lives results in the highlighting a STEM instead of a STEAM Curriculum in our schools. Society needs its students to learn Science, Technology, Engineering and Math — STEM. Society also needs its students to study Science, Technology, Engineering, Art and Math-STEAM. This global importance of Art to the general public warrants that K-12 students study Art up close in a designated learning space in school: The Classroom Museum. Symbolically, it stands to highlight the relevance of Art to society past, present and future. It is a “pledge” of our willingness to help our students meet the demands of a changing world.

“The work of Art provides a perfect example of that universal characteristic of human existence—the never-ending process of building a world.” (Gadamer, 1986, PP. 103-104) It is what we as humans do and what we appreciate. An excellent education will include Art Education.

“Imaginative expression and critical thinking are central to any definition of excellence in education. They are necessary if we are to be citizens who take responsibility for our own thinking and actions, and who engage in learning activities beyond formal schooling.”(Lazerson, 1985, P. 71)

The Classroom Museum is expected to be a beautifully designed space in the school whose center piece is a curated museum quality exhibition done with reproductions of museum masterpieces, for learning purposes. The Curator and Art Educator will work in tandem with each other to come up with a theme for the exhibition display suitable to the
The needs of the students. The students are challenged to make this view of Art meaningful to themselves through the skillful questions of the Art Educator.

The Curator is responsible for the exhibition. Once the exhibition is running, the Art Educator enters the scene to facilitate students toward an engagement with Art in the exhibition through talk; dialogue and discussion. This is not an ordinary classroom. This is a Classroom Museum. They will learn to view the Art and talk about the Art. In the process, they will learn to appreciate the Art. This Classroom provides the students with Art Criticism (Anderson, 1993). Here they learn through talking about Art. They will become engaged in learning to make their viewing a meaningful learning experience that broadens their world. The Art Educator will systematically ask three questions in varying ways.

“What is this?”
“What does it mean?”
“What is its significance?”

This will translate into the students doing the following:

- describe
- interpret
- evaluate

The skillful Art Educator will find various ways of asking these questions. There will be much discussion in the room.

The Art exhibition in the Classroom Museum is a social event that brings students together to engage them in Art and with each other. They will have lots of practice in observing Art guided by a skillful Art Educator’s questions. They will learn to pay attention to details that are often overlooked with a glance. They will observe — look at closely. Details are important if the students wants to formulate an accurate interpretation of the work. With this knowledge, the student will verbally articulate his/her findings to the groups along with the other students. These students are engaged in talking about Art facilitated by the Art Educator’s skill in weaving important background information. From the text, i.e. history, provenance, and its given meaning (all provided by the Curator) into the discussion. This kind of quality talk will provide an in-depth view—an insiders view of the Art work. From observations, the students go to meaning. Students express what they think is being communicated based on what they observe. In the process, they are constructing meaning. They are going beyond the information given and constructing new meaning, new knowledge, and new understanding. This may differ from the view held by their peers, but that is ok. Their findings will take on greater depth with time, experience and age.

A School “… Curriculum is a mind altering device. We design programs not merely to improve schools, but also to improve the ways in which students think” (Eisner, 2003, p. 13)
The ultimate purpose of the Classroom Museum is to improve the way students think about the world and the possibilities in the World. While they are encouraged to give articulate voice to what they observe, they are indirectly encouraged to imagine — to use their imagination — what is not now but can be — what might be possible or likely. This environment sets the stage for a maximum learning outcome for each active participant. All students are encouraged to participate.

A culture populated by a people whose imagination is impoverished has a static future. In such a culture there will be little change because there will be little sense of possibility. [Eisner, 2002, P. 5]

The Classroom Museum can be used to some degree in all K-12 grades. It can be most effectively used with High School students — leaving them better equipped to think about the broader world they are about to enter.

Jean-Francois Millet (1814-1875) was a peasant, an intellectual, and a painter who was born in Gruchy, Normandy a hamlet of approximately 10 families. He lived with his parents, 7 siblings and three extended family members in a stone house that once belonged to his paternal grandparents. As a young family member who worked with his peasant family in the rural fields of France, he experienced firsthand the harsh conditions under which peasant labored. He was a peasant who loved to read and to his list he could add: The Bible, Virgil, La Fontaine, Byron, Dante, Shakespeare, Milton, etc. He could also engage in intellectual discourse on a wide variety of issues. The Art critic Robert Herbert described him as “...the most erudite artist of his generation... “ [Murphy, 1999, P. 5] Millet’s father, an organist and a calligrapher, noticed that his son showed a natural talent in drawings of their environment and sent him outside of the hamlet to study and further develop his gift. Eventually, he went to Paris where his works became known to those in the field of Art. Millet would in time marry and have 9 children. As a painter, he is most widely known for four works of Art depicting peasant life. They are: The Sower, The Angelus, The Gleaners, and Man with a Hoe.

Jean-Francois Millet is often referred to as “the peasant painter”, he put peasants front and center, as the subject matter of his canvas depicting French agricultural life.

The fact that Millet was born on the land is the single most important factor in his life and work.... Millet knew the land and its labors, its seasons, moods and forces. He knew the peasants attitude to life and work. [Pollack, 1977, P. 8]

With a focus on his oil painting, “The Gleaners” completed in 1857, Millet widened the parameters of French Art by focusing on the lowest level of French peasantry—Gleaners. Many of his critics thought them unworthy of such artistic attention. Millet painted them with realism and dignity. Realism they would handle but not with any hint of dignity. Millet made a familiar scene unfamiliar with this painting of peasantry—Gleaners. In this painting, we see three peasant women, at the forefront of an expanse landscape of
agrarian activity, with their heads facing the earth each gathering left over grain from the crops harvested. These three peasants were working together as a team gathering grain: evidence of orderliness. Occupants of time and space to which we are granted an interior and exterior view through Art. There is also evidence of gender roles, labor differentiation, and weather consideration in “The Gleaners.” Millet gives us social, economic, political and environmental conditions in one painting. All of this beautifully executed for the beholder to feel their toil. “Our vision of Gleaners is the vision put forth by Millet,” [Vardi, 1993, P. 1426] He made a difference through his Art. He was the embodiment of change. He was a peasant.

Edmund Phelps 2006 Nobel Laureate in Economics writes in his book Mass Flourishing “... What a modern economy needs... is people eager to exercise their creativity and venturesome spirit in ever-new and challenging environments. It needs people who when they were young read the ... works of the imagination.” [Phelps, 2013. P. 324] In a School Classroom Museum where students are viewing curated exhibits and engaging in Art criticism with an Art Educator and Art Curator (indirectly) they are “reading” works of the imagination. This is what helps to create Mass Flourishing of individuals at the grassroots level so that the economy is a dynamic one for sustained periods of time.

The School Classroom Museum would ensure that students spend more time viewing, thinking, studying, talking about and enjoying works of Art of a wide range. This will result in a meaningful learning experience. It would help to develop imagination, creativity, innovative thought and risk-taking abilities in students. Stressing STEAM by incorporating a Classroom Museum for students to learn about Art is an investment in the future generation. Art is relevant to the individual, the culture, and the society.

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ART AND SELF-KNOWLEDGE

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I: WHAT IS THE INQUIRY?

The endeavor for self-knowledge as a priority for well-being traces back, in the philosophical tradition, to Socrates. Before Plato’s equally futile search for essences is the imperative “know thyself.” There are multiple reasons for the priority of this imperative, perhaps the most fundamental one being that self-knowledge is an a-priori condition for any sort of moral maturity or moral clarity.

Inevitably, however, given the push and pull of philosophical discourse and debate everything, literally everything, about self-knowledge comes into question. The relentless “self-critical” approach to philosophical argumentation questions the legitimacy of any self-knowledge or any methodology for self-knowledge. We might ask, following Hume, the seemingly innocent question: what are we supposed to be inquiring into? Once we follow up on this question in an empirical fashion, knowing the self is nothing more (or less) than knowing one’s own mental states and how those mental states are interrelated. Kant rightly upbraids Hume for a skeptical short-sightedness: Hume needs to presuppose the existence of a unified something or other for the inquiry into his own mental states. Kant calls this something or other, the transcendental unity of apperception and he argues that this a priori unity is a necessary and analytic condition for self-consciousness. Kant’s points and arguments are intended to be metaphysically thin: the “I think” must be able to accompany all our thoughts and the “I who thinks A must be the same as the I who thinks B.”¹ In short, for human consciousness to be the sort of consciousness it is, we must presuppose the transcendental unity of apperception.

Kant famously contains his own insight and arguments; the actual nature or content of this unified subject is off limits to both a priori and empirical inquiry. What we ultimately seem to end up with for the pragmatic endeavor for self-knowledge is the same Humean conclusion: to know the self is to know our own mental states and how those states are related to one another. Here we find the beginnings of empirical psychology and, for the ordinary notion of self-knowledge, there do not seem to be any plausible alternatives. Knowing the self is entirely empirical and it is a matter of a diligence in comprehending one’s own on-going psychological states. Such a project includes comprehending the history, causality, and relations between these psychological states.

Now one might ask: what more do we want and what more could we get? Once stated in this way, the quest to “know thyself” seems daunting enough and some additional quest to go beyond the intricacies of our mental states, their history, causes, and relations, seems philosophically haphazard. A search for the essential nature of the self, apart from the empirical content of our mental states and so forth, is a fool’s errand in metaphysical and epistemological speculation.
In this foray, I am going to argue that Kant’s transcendental sort of move can be translated into more conditions for self-knowledge. What is it, in other words, that makes the nature of our own mental states characteristically human mental states? This effort is empirical while, at the same time, containing some rationalistic or a priori elements that I hope remain relatively uncontroversial at least in principle. Second, I am going to argue that this same inquiry reveals the conditions of meaning within human life and then I argue that the conditions of meaning within human life are the conditions of self-knowledge. Finally, I argue that it is within this discussion that the relationship between art and self-knowledge is revealed. The thesis or conclusion can be articulated in this way: art and self-knowledge conflate or self-knowledge is a condition for art and art is a condition for self-knowledge. In the efforts that follow there are theses that “mutually condition and imply one another.” What falls out of these arguments and ideas is a revised version of the self, represented in art and consistent with philosophical and empirical arguments, that is strongly relational and never epistemically singular.

I am not pretending that the following arguments are complete or successful. And I am well aware of the difficulties of the project. But if I can just circle, even if just barely and not perfectly, the proper content I might be able to give some credence to the idea that human beings simply cannot know themselves as human beings without art.

II: THE FRAGMENTS OF SELF-KNOWLEDGE

What does it really mean to look into human mental states from what makes them possible? Various forms of causality might be enough and it is generally assumed to be enough from the side of empirical psychology. The Kantian-type point I am making starts with an empirical given: human mental states and human consciousness are what they are from self-consciousness. And this, in turn, seems to require that we determine the precise nature of self-consciousness while at the same time being denied access to the self. The question then seems to come down to what are the limits and conditions of what we call self-consciousness.

This question is frightening and I can only come at it with a handful of resources. First of all the Hume/Kant exchange on the ultimate nature of the self, as that which has the particular mental states and is conscious, is impossible to find because it is the place from where we look. I believe that this already has aesthetic implications but what then stands out is the manner in which our own self-inquiry is intrinsically limited. Human self-consciousness is then grossly finite or inhibited by its own nature for discovering its own nature. What becomes most interesting is then not the “search for the self” but the manner in which the search for the self flounders and fails. And both humor and tragedy have roots in this point because the search is premised on a certain form of impossibility: the self can never find itself because it is our center of orientation and the very idea that the self can be present to the self cancels itself out. This is an epistemic impossibility. The self is epistemically finite in relation to itself. It is in facing this finitude that we gain fragments of self-knowledge.
Second, all of our psychological states as empirically given are grossly contingent. My own thoughts move around in ways, and in such a manner, that it is foolish to consider them as wholly self-generated or self-controlled. In constructing this essay, the best hypothesis that I can generate from our shared knowledge of reality is that “I” don’t create, direct or manage my own thoughts as if the “I” is in some purely unified totality. It is never quite transparent to myself as to whether or not I move my thoughts around like chess pieces, even when in states of focused deliberation. At the same time, there must be enough available unity and totality to have these insights about my own thoughts. Emotions-in strict analogy with thoughts- are given texture, depth, shallowness or intensity through and from all the causality produced by relations. Emotions can endure for quite some time, as can belief states or thought patterns, but their emergence and duration are drastically inhibited or enhanced by contingencies: in short, by what we cannot even know much less control. The limitations of the self are here the limitations of the properties of the self in relation to the effort to know the self. Insofar as art is a distinct but related set of practices aimed at revealing basic elements of the human condition, it is then tied to these limitations. Art, in order to get at the condition of the human self, must struggle with these limits.

The above are conditions of self-knowledge: we cannot begin to grasp our individual condition apart from these facts about human reality. And because finitude and contingency are embedded features of our mental states they urge an appeal to relations for comprehension. We must consistently “look outside ourselves” to know ourselves. This point is thoroughly empirical. As soon as anyone works on tracing a thought, desire, or belief, etc., she winds up outside herself. And whether or not we can adequately or sufficiently ground the trace to a cause or causes is often unlikely or just arbitrary. Self-knowledge is on this view the knowledge of these two limits: finitude and contingency. The third feature for the condition of self-knowledge is hardly surprising. Mortality abruptly enters the picture in light of finitude and contingency. We should expect-from basic rational inquiry-that finitude and contingency within the origins and formations of the self are the DNA evidence of mortality. Within this discussion, one that gets this basic, is the real threat of banality and how to avoid it when so much is written about mortality is a very difficult task. But what I want and need to say here is that mortality, not just the fact of our death or end, but all the limitations that are elements of that mortality, inevitably form the reality of the self. The old and simple tales of escape from mortality, whether religious or flatly psychological, are the ironic evidence for this claim. That the human project would become the escape from our own limits is, on the face of it, rational. It becomes irrational and an obfuscation of self-knowledge as we see that the limits are what make up our condition, even our own thinking about our condition.

If we stay focused on “thoughts” as paradigmatic of human cognition it becomes transparent, just through reflection on the concept, that any thought must have meaning. So the claim that meaning in human life is dependent on mortality seems false. What we have to do, to see the point, is distinguish between “the meaning of a thought” and “the full significance of a thought.” (This distinction mirrors the one between grasping the facts of a situation and comprehending a situation.) Consider, for instance, a series of well-formed sentences that represent the content of a thought process. That such a series
of sentences has meaning is assured by semantics and syntax: hence, the sentences can be taken “out of context” and still have meaning in isolation.

That same series of sentences gather what I am calling “significance” as we can find their place in a context or, more precisely, within the temporal order of a life. But then the temporal order of a life needs limitation to provide significance and here I am not presupposing the above claims about finitude. “To place into context” is already to assume limitation in a temporal order because an “unlimited context” is a contradiction. This a priori reasoning makes sense out of gritty and direct empirical claims that overtly crucial human activities such as “raising children” or “finishing a worthy task” have significance just because they are embedded in a finite life. **Mortality becomes the epistemological and metaphysical ground for our ordinary concept of context.**

This distinction between the meaning of a thought or a series of thoughts and the significance of a thought or a series of thoughts is symmetrical to the more directly aesthetic distinction between “knowing the facts of an event” and “the comprehension of an event.” For example “everyone knows from the newspaper article that Joe Smith was killed in a bar fight last night by Jack Jones.” The article goes on for a page or two and it has been duly fact-checked. Knowing the facts is to know “what happened” along the same lines as knowing what a series of thoughts mean in isolation from when and why such thoughts occurred. Much of aesthetic exploration is the endeavor to find significance through comprehension: this is to further recognize what I have been calling the conditions of self-knowledge. Without the concrete recognition of our limitations we will always find ourselves on the edges of significance.

### III: SELF-KNOWLEDGE AND ART

Artistic practice as it calls upon the imaginative and conceptual faculties to create inevitably does so from the inescapable limits of the artist. This is a tautology but it is often overlooked. It is one thing to say that the artist creates from her own inescapable limits and another to specify the limits so they apply to any artist. But the object of creation, including any “character” or “representation” (as in visual art) brings along the same limits. Here intent has a fundamental place and so claims about inevitability must change accordingly. The artist and the work of art can intentionally bend toward realism and as they do they will engage the brute facts at the base of self-knowledge and so will provide the conditions for significance.

No “real” character and no “real” representation can be created, and here we escape the genre term “realism” without having the limits in question embedded. And these limits of finitude, contingency, and mortality go back and forth. They are first essential elements of the character or the template of the character. But the limits are formal and flexible; they determine or impinge, liberate or redeem as the character is created into context. The same, I think, must be true of painting. The presence of human finitude and contingency, as I described them, allows for creation to be a matter of continuous possibility because the ever present limits are the epistemic and ontological ground of context.
Artistic discipline and diligence is then principally a matter of intentionally schematizing the limits discussed with a particular narrative or visual field. How this is done is a matter of a starting place, where initial limits are placed on limits but within any starting place there will be rules for the schemata. Narratives cannot intentionally embed our limits without a constant schemata that works to explain and reveal our limits. Examples might seem superfluous given that I am arguing that any imaginative creation engages these limits, but- and this is again a turning point- it might not do so intentionally. The American novelist William Faulkner, for example, took on and created some of the most outrageously real characters in literary history. He did so with a schemata of inversion: he constantly leveraged the human tendency to obfuscate our limits to reveal those limits. The ragged beauty of his most violent characters comes from the fact that we ultimately see their explanation in the all too human struggle against human limits. Mortality has its enormous imaginative and creative potential just as we see its necessity for the meaning of our lives and just as we deny that necessity at the very same time. Artistic discipline is then a sense of how we make what we know about our limits existentially appear in such a way that the limits cannot be finally denied. This, I believe, is the ground of beauty and empathy.

The “explanations” I mentioned in the above are vital for the revelation of limits and so the revelation of human reality. Returning to Faulkner, I recall my experience in first reading his novel *Light in August*. I knew it was about a character named “Joe Christmas” which I thought had to be comically absurd. What Faulkner managed to do was a schemata of focus: he brought to the name an enormous weight of human contingencies that explained not just the name but at the same time the character himself. At the same time, the contingencies present revealed the illusion of singularity and the reality of human relations. The actual character is formed by all sorts of events, histories, and persons entirely unknown to him that make up a web of relations. In Joe Christmas our finitude is again revealed through a schemata of inversion: the dreadful sequence of events in the novel is finally dependent on the myth of singularity which is, in turn, a denial of finitude. This same schemata can be seen, I believe, in the Pope paintings of Francis Bacon, although I do not have time to analyze this here in any complete sense. The idea is that the paintings reveal the horror of presumed transcendence. The further idea being that we cannot finally deny our limits.

One might say that self-knowledge is grounded in realities that compel us to deny self-knowledge. If what I have argued here is near or around the truth then I think it is going to follow that art is uniquely equal to the task of self-knowledge. The premises that force this conclusion are scattered through this essay and are admittedly too difficult to gather now into one argument. But the central idea is that artistic practice of all sorts can eliminate various steps in “aboutness.” Art has immediacy that resembles simple perception so that, under the schemata discussed, we can become as close as possible to being “I-witnesses” to ourselves. In the long and difficult history of aesthetics this form of truth, the “I-Witness” of art, has been consistently under the thumb of propositional and discursive truth.
IV: ART AND EDUCATION

Suppose, for the sake of argument, we assume that technology is not a nearly infinite collection of gadgets and machines. Suppose, we assume the views of technology articulated first by Heidegger and later by Albert Borgmann, that technology is a worldview; we live so far within this worldview that it is quite difficult to detect its contours much less its leading rules or principles. Suppose further that Heidegger and Borgmann are correct that a leading principle of the technological worldview is to divide means from ends for the sake of ends. Borgmann calls this “the device paradigm” and we can see it at work with everything from climate control to human communication. The telos of the design paradigm is to fulfill “the promise of technology” which means, finally, to address elements of the human condition that I am discussing.

The worry from my above arguments is that the device paradigm and the technological worldview will sever ties between “the ends of art” and “the practice of art.” We see this around the fringes already with STEM apparently needing art for imaginative capacity and then, of course, for problem solving: we get the clichéd and dangerous notion of art to produce people who “can think outside the box.”

Kant famously said that the appreciation for nature and natural beauty for its own sake can be a ground or bridge for the moral disposition. And the moral disposition is complete without any outcomes; we pursue the morally good for the sake of that pursuit and that pursuit just is the morally good. The same is true about art. Its context is itself, the disposition to pursue the activity for its own sake. It is within that practice and the practice of engaging with art strictly for its own sake, that the realities of self-knowledge emerge and are then revealed. As we focus on the practice itself or the objects of the practices simply for the sake of focusing on them we come to know practices and the objects of those practices in ways that are otherwise unobtainable.

The worry then is quite grave and spiritually agitating. Technology, with STEM or STEAM, is the ruling principle or the worldview driving the ambitions. We will then create things and gadgets that will not contribute to what I am calling “significance.” Or, more importantly, we might create things and gadgets that will obfuscate significance and so the limits that form the conditions of self-knowledge. Only insofar as we learn to care for things or practices for their own sake, will we learn the nature of those practices and things. And this sort of care and protection of the intrinsic nature of practices and things is the only way we can learn of their value: this much, I think, is what it means to be “liberally educated.” As we care for things for the various outcomes of that care, we will not learn anything of significance about the value of those things.

Really, what we have is a simple epistemic point that paves the way for ontological insight. Art is a form of paying attention to ourselves and the world. If that is essentially correct, in broad outline, then paying attention for the sake of paying attention is analytic to art. This is a necessary condition of art. Human beings appear, for example, in a novel or in a painting, for the purpose of appearing in all the manifest ways in which we appear.
Analytic to that creation is then whatever makes that appearing possible and I have been pointing to three basic limits at the base: anyone who truly pays attention to human beings will have to somehow recognize these limits. But, as I tried to argue, to expose these limits is the beginning of context and so significance. Art is the manner in which human beings can experience the nature of their own experience and this is as close as we can get to being “I-Witnesses” to ourselves.

NOTES

2. See O’Shea, op. cit., p. 149.
FOURTEEN VALUES OF THE ARTS AND COUNTING

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I twist turn the theme of the conference a bit from “why study art?” to “what are the values of art?” on the assumption that an answer to the second also answers the first. Monroe Beardsley observes that “anyone who contends that the arts deserve a high place among the goods of culture and the ends of education . . . [should] back up this contention.” I will attempt to back up the claim that the arts deserve a high place in culture and education with an examination of a list of the values of art, some very briefly, but others in some detail. I shall focus primarily on the visual arts, but I believe that most of these values can be applied to all of the fine and performing arts. I begin with a list from Monroe Beardsley’s classic, Aesthetics. Beardsley offers a very brief comment on each item on his list. I will expand each a bit.

1. Fulfillment of the artist. The first of Beardsley’s values is that for artists, art-making is a means of fulfillment. Artists sometimes claim that they must engage in the artistic process of creation, suggesting that they have a strong psychological drive to do so. The caveat which needs to be added to this value is that there are many motives which drive artists—fame, fortune, rebellion against traditional occupations, escape from everyday concerns. But many artists do appear to create out of a deep-seated need, rather than for fame and fortune. Emily Dickinson published only seven of her 1,775 poems during her lifetime.

2. Promote mental health. Beardsley proposes—within the context of a discussion of teaching students to perform on a musical instrument, learning to dance, making up songs, writing stories and poems—that art is a “way to release pent-up energy, work off frustrations, lessen tensions, [and] restore a sense of balance and perspective.” He suggests that this can be applied to both the artist and the consumer of art. “Participating in art,” Beardsley elaborates, “may relieve tensions and quiet destructive forces.” He adds that “a world in which people, in the normal course of events, found their streets and buildings and workplaces filled with harmonious shapes and colors, . . . who spent part of each day listening to or performing musical compositions of high aesthetic value . . . would be a society . . . in which many common neuroses and psychoses . . . would not arise.”

3. Art fosters a community of feeling. Beardsley’s next value is that aesthetic experience fosters mutual sympathy and understanding. Although Beardsley does not refer to a source for this value, the person who developed this idea most fully is Leo Tolstoy (1828-1910) in his classic What is Art? (1896). Tolstoy proposes that art, like speech, is a form of communication. Art differs from speech in that art communicates feelings rather than ideas. If art is successful in communicating feelings (for Tolstoy also a criterion for judging whether a work of art is good), then it creates a community of common feeling. Good art is “infectious,” in Tolstoy’s phrase, in the sense that it
spreads a feeling among participants in the work of art and thus forms a community. Lest one dismiss this idea as ridiculous, think of the occasions when a music concert bonds the entire audience into a shared emotive experience.

4. The artist offers ideals of human life. Beardsley offers little clarification on this value. But Marx and Engels in the German Ideology (1846), in the context of discussing the ideal form of labour, make a suggestion which perhaps clarifies this value. Marx and Engels propose that human labour ought to be similar to the way the artist works. In a passage in which Marx and Engels assail the division of labour in the factory system in which workers perform ever smaller mind-numbing tasks, they contrast this with the following ideal, which seems to be very close to Marx and Engels’ image of the way artists work.

For as soon as the distribution of labour comes into being, each man has a particular, exclusive sphere of activity, which is forced upon him and from which he cannot escape. He is a hunter, a fisherman, a shepherd, or a critical critic, and must remain so if he does not want to lose his means of livelihood; while in communist society, where nobody has one exclusive sphere of activity but each can become accomplished in any branch he wishes, society regulates the general production and thus makes it possible for me to do one thing today and another tomorrow, to hunt in the morning, fish in the afternoon, rear cattle in the evening, criticize after dinner, just as I have a mind, without ever becoming a hunter, fisherman, shepherd or critics.

If indeed Marx and Engels in this passage are using their image of the artist as their ideal, they probably have a highly Romanticized vision of the artist. Nonetheless, the passage does offer an insight into labour in contemporary society. Labour, at least at the unskilled level, has become increasingly divided into minute tasks performed repetitively. The artist, by contrast, offers an ideal model of the worker who not only works in a non-repetitive fashion, but who conceives of the project, and is involved in every stage of production.

Forty four years after Marx and Engels wrote The German Ideology, William Morris (1834-1896), in a series of essays and a utopian novel, News from Nowhere (1890), offers a utopian vision of an England in which small workshops have replaced large factories, large cities have mostly disappeared, all making is art-making, and the environment is filled with meadows, clean rivers and air, and beautiful buildings. I will comment briefly only on his vision of all making as art-making. In his 1883 lectures, “Art Under Plutocracy” and “Art, Wealth, and Riches,” Morris proposes that the ideal system of production and art reached it high point in the Middle Ages. Apprentices learned their craft from “end to end.” “and felt responsible for every stage of its progress”. Production proceeded in a leisurely and thoughtful way. “Such work was slow, but it was always intelligent work; there was a man’s mind in it always, and abundant tokens of human hopes and fears, the sum of which makes life for all of us”. The whole man—mind, body and creative spirit—was involved in production. Morris goes on to contrast
this “workshop-system of labour” with the “world-Market,” that is, the factory system with its minute division of labour. In the latter, workers have no sense of the whole, no leisurely contemplation of the project, no use of intelligence, no creativity. “Under this system, all the romance of the arts died out . . . .”17

Morris’ model here for the ideal of work is the artist. In *News from Nowhere*, he asserts that most work “can be treated as works of art . . .”.18 There was a time in the past, he laments, “when art was abundant and healthy, [when] all men were more or less artists; that is to say, the instinct for beauty which is inborn in every complete man has such force that the whole body of craftsmen habitually and without conscious effort made beautiful things . . . .”19 Projects were conceived from beginning and seen through to the end, the work was creative, and it was pleasurable.

Morris’ proposal that work should and perhaps even could look more like the artistic and craftsman ideal may strike one as utterly utopian. But perhaps Tony Judt (in a 2009 essay) asked the right question: “Why is it that here in the United States we have such difficulty even imagining a different sort of society from the one whose dysfunctions and inequalities trouble us so?”20

5. **Aesthetic experience refines perception.** Sometimes art has the power to enhance our sensations, feelings, and imagination.21 After viewing an impressionist painting, we may see the grasses waving in a field, or the flowers in my yard, or the surface of the sea, in a new way. When this happens, art has refreshed my perception. Art has taught me to see in a new way.

Oscar Wilde (1854-1900) discusses this in his dialogue “Decay of Lying” (1889). He states, with his usual hyperbole, that Life is an imitation of Art.22 In the dialogue, Vivian states that Nature is “our creation” and what we see “depends on the Arts.”23 He uses the example of the London fogs: the Impressionists gave us those “wonderful brown fogs that come creeping down our streets, blurring the gas-lamps and changing the houses into monstrous shadows.” and “the silver mists that brood over our river . . . .”24 I take Wilde’s comments as deliberate exaggerations for the sake of provoking his readers. But Wilde’s suggestion that art—as well as many other influences—affects our perception of reality seems to be true. We still tend to see mountain scenes the way Ansel Adams photographed them.

This is Beardsley’s list with my commentary. I now leave Beardsley and turn to some additional values of art.

6. **Art as a way of worldmaking.** Nelson Goodman pushes Wilde’s suggestion even further by proposing that art is one among many ways of making worlds. In his classic *Ways of Worldmaking*, he argues that there are a plurality of versions of the world, and that these are not reducible to any one world. “Worlds are as much made as found.”25 “Knowing is as much remaking as reporting.”26 Among the worlds are science, religion, everyday, and art.27 Art making is simply one of these constructions of worlds. Art is different than science, religion, common sense, etc., but not because it is less real or less
true, but because it is practiced in different contexts. Goodman’s thesis is an antidote to the widespread physicalism of today—the view there is only one true system of reality and its base is physics. Goodman dismisses physicalism with a simple question: How can Constable’s world-view be reduced to physics?

Goodman’s thesis about world-making is very dependent on a constructionist view of human knowledge, a view I am not prepared to embrace. But the value of his thesis is to propose that art worlds should not be dismissed as mere escape or fantasy. They should be taken seriously as a way of living in a world.

7. Art captures the richness of individual experience. Oliver Sacks (1933-2015) in one of his marvelous essays (“Neurology and the Soul”) observes that

there has always... been a split between science and life, between the apparent poverty of scientific formulation and the manifest richness of phenomenal experience. This is the chasm which Goethe refers to in Faust, when he speaks of the grayness of theory as contrasted with the green and golden colors of life:

graue, Treuer Freund, ist alle Theorie, Gray, my friend, is all theory
und grün des Lebens goldner Baum. And green the golden tree of life

This chasm—which is smallest in physics, where we have spectacularly powerful theories of countless physical processes, is overwhelming in biology, in the study, above all of mental processes and inner life, for these are, unlike physical existence, distinguished by extreme complexity, unpredictability, and novelty: by inner principles of autonomy, identity, and “will”... and by continuous becoming, evolution, and development.”

Taking this cue from Sacks, I propose that art, perhaps more than any other human expression, captures the richness of phenomenal experience. Is it the only “markings” of humankind which captures and records the richness of experience? Perhaps. The sciences do not; philosophy and law do not. History perhaps comes closest. But historians also must abstract and formulate causal connections in order to offer explanations of events. By contrast the arts, and perhaps only the arts, immerse themselves into the richness of human experience, and express this richness in dance, music, painting, sculpture, drama and literature.

8. Art as social and political criticism. There is a long tradition of artists using art to challenge the social and political values of society. One painting which has become part of the canon on protest art is Francisco Goya’s (1746-1828) The Third of May 1808 (1814) and his series of prints “Disasters of War.” In the early 20th century, Dada (1916 - c.1923) began primarily as a protest against World War I and capitalism (which Dada artists viewed as intertwined). As the German Dadaist poet, Hugo Ball, expressed it, “... For us art is not an end in itself... Art is for us an occasion for social criticism, and for real understanding of the age we live in... Dada is not a school of artists, but an alarm system against declining values, routine and speculations...” In the mid-20th century,
Picasso created *Guernica* (1937) (Museo Reina Sofia, Madrid) as an expression of outrage over the bombing of the village of Guernica by the German Luftwaffe in support of the Nationalist side of the civil war. Social and political criticism is, of course, is not unique to art. But art has the power to engage in such criticism in a more powerful and dramatic way than many other forms of social criticism.

9. **Art as a causal factor in historical change.** I don’t accept the suggestion of some that artists have some special insight into the direction of social and cultural change and that they often anticipate such change. But it may be the case that art sometimes is a causal factor in social change. The Hudson River School artists’ depiction of the majestic views of western United States, albeit often highly imaginary and romanticized, may have played a small role in the rapid exploration and settlement of the West, with all of its tragic consequences for the native peoples. But these paintings may also have played a role in the eventual establishment of the National Park system. The photos of Dorothea Lange humanized the plight of migrant families fleeing the Dust Bowl.

David Brooks in a recent op-ed piece in the *New York Times* (August 2, 2016) discusses how Frederick Douglass changed the public’s perception of black people in the 19th century. Brooks notes that Douglas made himself the most photographed American in the 19th century.31 “He sat for 160 separate photographs,” outdistancing the 155 of George Custer and the 126 of Abraham Lincoln.32 In these portraits, Douglass was almost always formally dressed, in black coat, vest, stiff formal collar and bow tie. He presents himself as a dignified, highly cultured member of society. But he also projects himself as a person of determination and pride. Brooks states that Douglas “was using art to reteach people how to see.”33 The power of artists, Brooks continues, “lies in the ability to recode the mental maps people project into the world.”34

10. **The historical value of art.** Although art does not offer a systematic and explanatory account of history, it does something which explanatory history cannot do: it gives insight, in a visible or descriptive and concrete way, into the spirit of an age. Gothic cathedrals are witness to the spirit of community and deep Christian faith of late medieval Europe. Raphael’s *School of Athens* (1509-11) is witness to the new Renaissance humanism, the study of poetry, rhetoric, history, and philosophy on the basis of Greek and Roman art and literature. The Renaissance artists’ rediscovery and refinement of perspective (they thought they discovered it) is reflected in the many Renaissance paintings in which artists display their virtuosity with perspective. The techniques for depicting perspective dominate European painting right up to the early 20th century. Erich Maria Remarque’s *All Quiet on the Western Front* (originally 1928) brought an awareness to the general public of the extreme stress on soldiers fighting in the Western front trenches.

11. **Art as an escape from everyday routine and concerns.** Art can be, and indeed often is, used as an escape from everyday routine and anxieties. This use of art should not be eschewed as insignificant or trivial. Play is an essential part of our humanness and the lack of sufficient play is one of the failures of the modern age, especially in the United States. Beardsley draws a distinction between “mere entertainment” and art which is
entertaining. He proposes that mere entertainment is passive, easy, and superficial. Art, by contrast, is demanding, active, and has depth. But this way of setting off entertainment and art may be a bit too simplistic. Alexander Calder’s hanging mobiles, Claes Oldenburg’s use of greatly enlarged ordinary objects, and Jeff Koons’ polished steel everyday objects are entertaining, but they can also be explored at deeper levels. However, they don’t have to be.

12. Art discloses truth. The claim that art is truth-producing is fraught with difficulties. Jerome Stolnitz’s argues that art is cognitively trivial. He proposes that when art does present truths, these truth are always borrowed from other areas of knowledge. Stolnitz uses the example of Harriet Beecher Stowe’s descriptions of slavery in Uncle Tom’s Cabin. He grants that she offers a powerful portrayal of the oppressive nature of slavery. But this is a truth not discovered by the novel. The truth about the evils of slavery were known before the novel appeared. None of the truths expressed by art, Stolnitz claims, are peculiar to art. Art simply borrows truths from everyday life, or from history, or the social sciences, and re-expresses them within the surroundings of fictional characters and settings or in colors and shapes. Art, then, does not generate truths; it is parasitic of truth claims in other areas of human inquiry.

I agree with Stolnitz as far as his discussion goes. But Stolnitz fails to note that art sometimes plays an important role in bringing truths to the surface, heightening the public awareness of truth claims. The number of truth claims is so immense and so varied that all of them begin to appears on the same level of importance. Art can serve the role of selecting and highlighting some truths and through artistic expression can convince us of the importance of some truths.

13. Art is an antidote to the often-repeated statement about the inhumanity of man to man, or art as a witness to the grandeur of humanity. Before the advent of social and economic history in the mid-20th century, history was usually portrayed as an endless series of kings and generals and above all wars. To a considerable extent this is perhaps still the view of history of the majority of people. (Note the continuing popularity of the steady stream of books on WWII.) Art is an antidote to this. Art along with science and philosophical and theological systems is witness to some of the grandest achievements of humankind. And art is a dramatic and visible witness—from the 5th century Buddhist caves at Datong, the forum Romanum, the Gothic cathedrals sprawled throughout Europe, to Gaudi’s La Sagrada Familia cathedral in Barcelona.

14. Art as a way of relating to the spiritual and the Divine. Plotinus (205–270 AD), a Neo-Platonist of the second century AD, proposed that the artist is a co-creator of nature, that is, a co-creator with God. This is a theme which was often repeated in the Middle Ages. This is one way of relating art to God.

But here is another. If God is a personal God and as such analogous to humans, we would expect that the expressions of humans in the form of some of humanity’s most sublime achievements, art in all of its manifest forms, would be revelatory of the personal God. This argument relies in part on the Croce-Collingwood expressionist theory of art, or
something akin to it. Croce and Collingwood argued that art is the expression or externalization of the inner emotions and ideas (Collingwood excluded the latter) in objects and actions.

There is a third way of connecting art and the Divine. Art is, among other things, a special way of knowing, a way that is similar to the way of knowing in religion. The kind of knowing in art and religion is knowing by engagement, participation, immersion in. This may be contrasted with knowing in science or knowing the things and events surrounding our everyday lives. Here knowing is knowing by acquaintance, by treating things and events as objects distinct from ourselves.

The British philosopher John Cottingham in *How to Believe* (2015), who has developed this epistemology of art and religion, argues that artistic and religious visions of reality should not be dismissed as mere flights of fantasy. They have the possibility of “disclosures of the meaning of the world we inhabit.” Art and religion are similar in that they offer the possibility of “transformative vision[s] of reality.” They are transformative in the sense that they can change the way we see events.

This completes my list of nine values combined with Monroe Beardsley’s five. There certainly are more—e.g., all of the uses of art to enhance other activities such as advertising, politics, and religious liturgies. And there is the pedagogical uses of art—e.g., the use of art in churches from early Christianity to the present day to teach the stories of Christianity. The list of the values of art can and should go on.

**NOTES**

1. Beardsley, 557
3. Ibid., 572.
4. Ibid.
5. Ibid., 574.
6. Ibid., 575.
7. Ibid.
9. Ibid., 50-51, 140-141.
17. Ibid., 177.


23. Ibid., 233.

24. Ibid., 232.


26. Ibid.

27. Ibid., see especially chapter 4, “When is Art?”


30. Quoted by David Dunn in “A History of Electronic Music,” in *Classic Essays on Twentieth-Century Music*, Richard Kostelanetz & Joseph Darby, eds. (NY: Schirmer, 1996), 90. Dada also became an anti-art movement because traditional art was viewed as part of the capitalist system.


32. Ibid.

33. Ibid.

34. Ibid.

35. Beardsley, 559.


37. Ibid., 198.


39. Ibid., 55.

40. Ibid.
THE ROLES OF ART
A CONFERENCE “WHY STUDY ART?”

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INTRODUCTION

Art exists in all disciplines; they do not function well without art. For this reason it is hard to think about art exclusively as an aesthetic experience we encounter in a museum or a gallery. An ACM/SIGGRAPH 2016 keynote speaker Z. Nagin Cox (2016), the NASA Jet Propulsion Laboratory Spacecraft Operations Engineer, acknowledged the visionary power of George Lucas when she revealed, “No missions of space exploration would be possible without the technologies of computer graphics and the human/robotic interactions they enable.” (ACM is the Association for Computing Machinery; SIGGRAPH is the ACM Special Interest Group on Computer Graphics and Interactive Techniques, the largest computer graphics conference).

It is generally accepted that there is a growing need for visuals and knowledge visualization in math, programming, and sciences. Moreover, there are many applications and techniques where Art makes the inherent component. Generative art exhibitions reveal mathematical notions through images, graphics, animations, and interactive installations, so that the viewers can glimpse the beauty of the ideas involved. At the same time, there are many instances occurring in mathematics, applications, and techniques, old and new materials where Art is an essential element. The shell of a mollusk contains a logarithmic spiral. It is a natural phenomenon. A drawing of a logarithmic spiral is a mathematics-derived form. Artists find characteristics of natural forms and their mathematical description to create mathematics-derived artwork.

Visualization means the presentation of pictures showing easy to recognize objects that are connected through well-defined relations. It is a group of techniques for creating visual communication through images, graphics, and animations. When data is transformed into images, visuals allow the viewer to understand information. Cooperation with artists can amplify the quality of visualizations. Computers transform data into information, and visualization converts information into picture form. Applications of visualization may include data-, information-, and knowledge visualization; scientific visualization; visual analytics; educational visualization, and many other ways to create sensory, often interactive representation of abstract data. Information visualization is the use of computer supported, interactive, sensory (mostly visual) representations of abstract data to reinforce cognition (Bederson and Shneiderman, 2003). Information visualization shows the data interactively in many dimensions. Many authors agree that visualization supports cognition, reasoning, hypothesis building, and problem solving. The hands-on learning involves concrete operational rather than abstract thinking mode. Learning through visualizing ideas in graphical form results in expanding visual literacy through artistic presentation of knowledge with metaphors. Many themes related both to art and science
can be negotiated easier as abstract concepts. Knowledge is presented in a visual way when the learner and the researcher can compare and contrast data about processes and products, going beyond abstract concepts. This makes the information design domain comprising art, design, and webart.

Metaphors make a basic structure for communicating messages. The use of suitable metaphor is crucial for successful program visualization. Familiar pictures serve as metaphors of concepts or data. When we deal with several kinds of data, we may describe with metaphors the structure and the relations among the data. Metaphors organize knowledge. A visual metaphor presents a picture of an easy-to-recognize object that represents another, so we may mentally compare something that is not easily understood to something visible. As Stefan Bertschi (2009) put it, metaphors enable to comprehend and shape experience, understand one kind of things in terms of another, from the viewpoint of someone else. Metaphors may link the sender and the viewer by conveying not only perception but also the meaning. Visual metaphors serve for labeling various Web services, such as photos (Flickr), videoclips sharing (YouTube), microblogging platforms (Twitter), making the www. bookmarks (delicious.com), as well as using services like MySpace, Facebook, or professional networking (LinkedIn), and collecting online content (Twine). The Internet portals and communication media, such as the Web, videoconference software, and search platforms (e.g., Wikipedia) became more visual interdisciplinary, and more interactive.

Research and educational materials often offer the scientists and students multi dimensional presentations. Most of natural processes and events are complex and dynamic. When exploring high-dimensional space, we need measurements of many variables. For example, seven variables: x, y, z axes, time, temperature, pressure, and density describe the speed and state of an object moving in space (Cox, 2008). However, every visualization or simulation has to be attractive visually, created for both producers and recipients that are visually and aesthetically literate.

Visual presentation of large data sets is in demand because web became the main carrier of information. When we use the search engines, there is too much data to be scrolled on the screen, and new browsers are necessary to present information visually. It can be done with the use of information visualization, data mining, and semantic web. A big set of data can be presented in an interactive way on more than three axes. Users can navigate across big data sets, find patterns, relationships, and structures, and then examine their dynamic factors, resulting changes, and effects in real time. It can be done with the use of information visualization, data mining, and semantic web. All that would be invisible if presented numerically.

Figure 1 presents the London underground sentiment analysis. Using a combination of Vanilla JavaScript and CSS3 animations Edoardo L’Alstorina produced a visualization that consists of a live graph bar. Each bar in the graph is a London tube line and the volume of each bar indicates the number of passengers’ tweets per hour. And as this is a live graph, each bar smoothly animates to the new tweet size every 60 minutes. Moreover, on top of each bar is an emotion square that changes color on a 256 gradient scale. Green indicates
very good, turning towards amber when the tweets were balanced between good and bad, and animating into red when tweets were very bad because discontent from commuters results from a delay or an unexpected disruption of service. This visualization receives the live data every 60 minutes via a technology called websockets, specifically the socket.io implementation.

Figure 1. Edoardo L’Alstorina (2016). A screen capture from the data visualization app (© 2016, E. L’Astorina. Used with permission).

Simulation often serves for education, for example in teaching coding, 3D modeling, and training drivers or pilots with flight simulations. Interactive virtual reality applications go beyond traditional visualization. Augmented and virtual reality offers opportunities to create new experiences. Multinational software developers such as EON Reality create virtual, 3D reality, augmented reality interactive software, as well as immersive 3D displays and mobile applications. Real-time visualization is used in the areas of education, architecture, design, visualization, defense, and research. For example, the Idome developed by the EON Reality projects events into a geodesic dome, thus offering a 4D immersive experience with scents, wind, and mist included, while EON Coliseum is a software platform that enables communication for virtual environments. Smart networking engines are serving live presentations for the virtual classrooms and boardroom meetings.

Simulation allows designing scenarios for disastrous events or military training. Computer graphics are often used to translate data about events and processes into pictures, so they are easier to understand. Rapidly evolving 3D printing technologies support developing visually rich materials. Using digital image processing of organic forms may result in the 3D printed fabrication that seamlessly bridge synthetic and organic materials in 3D prints.

Many topics in visual mathematics provide inspiration for artists as aesthetically appealing forms. Geometry and fractal geometry, fuzzy logic, computer graphics, symmetry and perspective, complex polygons, tessellations of strings and lattices, tiles, Oriental mosaics, Roman mosaics, and mazes may serve as examples of such forms and actions. Algorithms are mathematical recipes for how to carry out a process. Coding is a procedure for solving a complicated problem by carrying out a fixed sequence of simpler, unambiguous steps. Such
procedures are used in computer programs and in programmed learning. Artists create algorithms for supporting their research, developing applications, and then creating generative art. Robotics created by artists, wearable digital art, and interactive installations contribute to our cultural environment.

**VISUAL LITERACY, VISUAL THINKING ABOUT SCIENCE**

The meaning of visual literacy has been changing due to the advances in techniques that make knowledge visible. Visual communication involves images as well as written texts. One can look upon or read the visual forms: 2-dimensional drawings, art works, graphs, graphics, or typographic prints; 3-dimensional forms, architectural or sculptural; 4-dimensional time-based media – moving images; or multidimensional interactive and virtual techniques.

In many instances knowledge visualization takes form of art. For example, in order to visualize the intersections across art, science and technology, my student Lindsey Foy took a picture of a leaf and used the connection points as roads (Figure 2). She highlighted one path and inserted an electrical spark to signify how technology helps us make connections. Lindsey Foy won the first place in the SPACE – Student Poster and Animation Competition and Exhibition at the ACM/Siggraph 2015 Computer Graphics and Interactive Techniques Conference ‘Xroads of Discovery.’

*Figure 2. Lindsey Foy, Xroads. (© 2015, L. Foy. Used with permission).*
BIO-INSPIRED APPLICATIONS AND APPS

A growing number of the visualization and simulation solutions are biologically inspired. Bio-inspired devices enhance, heal, or substitute our senses. They show invisible details, inform about levels of substances in our blood flow, support our memory, and perform difficult tasks. For example, a model using fractal geometry describes the layering in the biological structure of an Asian ribbonfish that has a brilliant metallic appearance. Bossard, Lin, & Werner (2016) developed mathematical algorithms to replicate those patterns in semiconductor materials. This model could guide the design of devices such as broadband mirrors. Bio-inspired computing including swarm computing or genetic computing often results in creating pervasive applications, such as ubiquitous apps for mobile devices, new approaches to social networking, multi-touch screen based collaboration, ambient, wearable computing, and new media art. Swarm intelligence guides the collective behavior of self-organized biological systems such as microbes, bacteria, ant colonies, schools of fish, flocks of birds, or herds of hoofed animals, which are interacting with the system members and their environment. Application of swarm principles has developed into swarm computing applied in creating algorithms for research, optimization, developing applications, simulations, and creating art. Biophotonics use light in a wide spectrum of the life science research, which results in visually stunning documentation. For example, the eyes of the mantis shrimp can see differences in polarized light through its compound eye. Researchers achieved such photosensitivity using aluminum nano wires as linear polarization filters, to produce sensors finding cancer cells and diagnosing diseases (York, Powell, Gao, & Kahan, 2014).

Numerous industries use serious games for various purposes, such as defense, education, scientific exploration, health care, emergency management, city planning, engineering, and politics. Interactive computer video games serve both educational and medical purposes. For example, my student Corwin Bell produced interactive games with biofeedback sensors that measure heart rate and skin conductance. Players learn to control their breathing, build mental serenity, and reduce their stress level. A game “Journey to the Wild Divine,” the University of Northern Colorado Master of Arts project, was the first computer biofeedback game (Figure 3).
CRITICISM OF THE PRODUCT DESIGN AND PRODUCT SEMANTIC

However, every visualization or simulation has to be attractive visually, created for both producers and recipients that are visually and aesthetically literate. Putting form and content together determines many definitions of the design aesthetics. We may examine whether an object design fulfills the functional, ergonomic, aesthetic, material-, and space-related demands, along with the product’s comfort, simplicity, elaboration, message, and easiness of use. Aesthetics of such product may be expressed as a pleasant experience intertwined with utility and usability.

Design and art are not divided into separate drawers now, especially when we build websites. Good design is an art form and good artwork is often designed for a practical purpose. Very often, mathematics, science, or computer science may inspire an artist to make an artwork.

THE ROLE OF ART AND VISUALIZATION IN TEACHING AND COLLABORATIVE TEACHING WITH THE USE OF THE VISUAL WAY OF LEARNING

It becomes increasingly important that teaching and collaborative teaching go with the use of the visual way of learning. The use of metaphors, data-, information-, and knowledge-visualization may serve for integrative science-art instruction with the use of computer graphics. From early childhood, education with art should include teaching several subjects supporting the development of abstract thinking, which are now reserved for the young adults or adults. Developing abstract thinking abilities is essential both in countless areas...
of life and in education. Abstract thinking can be seen indispensable when one strives to be virtuous in mathematics, philosophy, poetry, or science. The use of metaphors, data-, information-, and knowledge- visualization serves for integrative science-art instruction with the use of computer graphics and programming. Everybody should know how to code from the very beginning of schooling. Collaborative efforts bridge a gap between the ways we draw, code, describe, or otherwise explore Nature. Estonia, the birthplace of Skype, has launched in 2012 a nationwide program to teach students from the age 7 to 19, how to write code (Olson, 2012). Over 85 percent of Estonia's schools use e-School, covering about 95 percent of all grade school students (e-Estonia.com The Digital Society, 2015). "Coding is the literacy of the 21st century," said Zach Sims, cofounder of a New York City based company Codecademy (Upbin, 2011). Lessons in computer programming have been adopted in 2014 by the national curriculum for primary schools in England (Muffett, 2014). Coding can be learned in a visual way, even by creating art works. Figure 4 shows a work of a computer science student.

![Figure 4](image-url)

*Figure 4. Ben Hobgood, Playfish. (© 2000, B. Hobgood. Used with permission).*

Integration with science may help the students discover their individual strong intelligences, as described by Howard Gardner (1983/2011). The concept of the developmental stages has been applied to describe the process of evolving skills and capacities in the visual domain (Gardner, 1983/2011). A developmental psychologist Howard Gardner is best known for his theory of multiple intelligences (Gardner, 1983/2011, 1993/2006). Gardner defines intelligence as the capacity to solve problems or make things that are valued in a culture (at least one cultural setting or community). He developed his Multiple Intelligences theory and then called it a “psychobiological theory: psychological because it is a theory of mind, biological because it privileges information about the brain, the nervous system, and ultimately, I believe, the human genome” (Gardner, 1999, 2011). Howard Gardner’s list of intelligences include:

1. Linguistic intelligence – the ability to use language to express meaning, tell a story, react to stories, learn new vocabulary or languages. Poets exhibit this ability in its fullest form.
2. Logical/mathematical intelligence, prized in schools and especially in school examinations

3. Spatial intelligence – the ability to form a mental model of a spatial world and be able to carry out that model, and find one's way around a new structure.

4. Musical intelligence – capacity to create and perceive musical patterns

5. Bodily kinesthetic intelligence – the ability to use the body or parts of the body (hands, feet, etc.) to solve problems or to fabricate products, as in playing a ballgame, dancing, or making objects with the hands. Dancers, athletes, surgeons and crafts people all exhibit highly developed bodily-kinesthetic intelligence.

6. Interpersonal intelligence is oriented toward the understanding other people: what motivates them, how they work, how to work cooperatively and effectively with them. Successful marketing and sales people, politicians, teachers, clinicians, and religious leaders are all likely to be individuals with high degree of interpersonal intelligence.

7. Intrapersonal intelligence – the ability turned inward to form an accurate model of oneself, understand things about oneself: how one is similar to or different from others, and how to soothe oneself when sad and use that model to operate effectively in life.

8. Naturalistic intelligence – the apprehension of the natural world as epitomized by skilled hunters or botanists; the ability to recognize species of plants or animals in one's environment.

Introduction of many subjects in early stages of schooling may support the development of abstract thinking:

- Algebra and learning basic concepts of calculus are often easier for children than for adults. Differential equations describe everyday physical processes. Derivative of a function of a single variable is fundamental in understanding not only calculus but also basic life processes.
- Programming in various computer languages should be linked with traditional tools such as Lego Logo. President Barack Obama (2016) postulated that programming should be introduced in every school and pledged $4.1 billion to expand computer science classes, “offering every student the hands-on computer science and math classes that make them job-ready.”
- Music as the universal language may support easiness of learning new languages by enhancing students’ sensitivity to sounds, tones, and timbres specific to particular languages they are learning. However, symbols are different in specific fields: a symbol ‘C’ means another thing in music and in C++ coding.
- Visualization; visualizing processes and products through drawing.

The STEAM program (science, technology, engineering, arts, and mathematics) often replaces the STEM program (STEM to STEAM, 2016; STEM, 2014). The STEM to STEAM trend answers the call for the integrative instruction. STEAM is directed toward developing integrative education and changing strategies concerning human resources decisive for the workforce development.

TEACHING WITH VISUAL PROBLEM SOLVING
In my classroom, in a student-centered learning environment, students are actively involved in studying physics by visualizing selected topics and producing graphical illustrations of science concepts with the use of computer graphics. Visual learning projects are aimed to support learning process with the use of visual signs, symbols, icons, metaphors, visuals, photographs, and verbal coding. Multivariate, multidimensional graphics enhance the explanatory power of display. My concern is in encouraging non-linear thinking in students. I focus on image quality of student work. Projects for students aim at applying three ways of thinking about concepts in order to present them visually with the use of computer graphics or programming:

- Science-based topics inspire students to create artistic, often metaphorical presentations in Computer Art classes.
- Students learn science-related material in a visual way by creating projects showing their understanding of the concept in Computer Graphics classes.
- Students visually present information and data using their visual thinking.

To visualize learning material in a non-linear, interactive way, we can navigate among many supportive means, such as learning in connection with the peers; using a Flickr photo-stream; blogging illustrated writings; placing videos on YouTube; using social networking through Facebook, and gmail, where users can see a stream of updates from friends as well as photos and videos shared through Picasa and YouTube. Calligraphy can manage to combine a geometric discipline with a dynamic rhythm. Figure 5 presents a work of my student who juxtaposed an Arabic script and old cultural symbols with the contemporary QR code matrices, combining Islamic cultural icons with a quick response code (QR code). This image displays rich semiotic content by merging card design with the QR matrix barcode.

![Figure 5. Fatma Alabdullaziz, A design for creating a deck of playing cards. (© 2014, F. Alabdullaziz. Used with permission).](image)

Visual storytelling is an important tool in teaching and learning. Storytelling is the social and culture activity of conveying stories in words, sounds, and/or images, often by improvisation, theatraics, or embellishment. Stories or narratives have been shared in every culture as a means of entertainment, education, cultural preservation and instilling moral values. Crucial elements of stories and storytelling include a plot, characters, and the narrative point of view. The term 'storytelling' is used in a narrow sense to refer specifically to oral storytelling but also in a looser sense to refer to techniques used in other media to unfold or disclose the narrative of a story. Whatever we do, we tell the story, we record it.
through the use of many kinds of visual means such as storyboards, web trees, and sketches. We thus combine visual and verbal information.

CONCLUSIONS

To summarize material discussed in this paper, we can derive several propositions. Information can be presented in a visual way, often as art, in order to enhance knowledge comprehension and retention. Visual shortcuts communicate knowledge faster and effectively; we can talk about beautiful information. Everybody should know how to code from the very beginning of schooling. Coding can be learned in a visual way, for example by creating a digital artwork. Collaborative teaching by art and science instructors can bridge a gap between the ways we draw, describe, and explore Nature.

BIOLOGY


