Cultivating Better Collaborative Explorations:

A Discussion about Discovering New Connections in Science and Society

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"The only difference between fear and adventure is how much you breathe." ~ Rob Kalnitsky

A note about Audience and Context:

This paper was originally framed in the context of a course on Biology in Society in the Science in a Changing World: Critical and Creative Thinking Program at the University of Massachusetts Boston. Part of the process of creating this paper included choosing an area of Biology in Society in which to engage critical thinking participation. Originally my interest invited vested parties of Cornell University NYSAES (New York State Agricultural Experiment Station in Geneva, NY) around topics related to formulating a mission statement for the grounds as it relates to stewardship for the environment and also stewardship of the research and outreach goals of the station and College of Agricultural and Life Sciences. What happened during the course is that I found this focus and audience limiting my thinking in a much similar way to how we tend to focus our energy towards problems… from a position we currently know, from a story we tell ourselves, from systems learned and tested through personal experience within cultural value systems.

As a result, I found myself broadening the potential audience to include graduate students and peers among the horticulture profession, not just those at NYSAES, to allow more open thinking. As I reflected upon the installments and tools presented, I realized my audience needed to grow to follow my developing connections and bigger picture concepts before being able to apply them to real world problems. So in this final work, I am including anyone interested in thinking more broadly about implications beyond the narrow scope of scientific research itself… maybe in creating working teams to solve problems together, letting voices be heard and empowering people to take action through participation. Therefore, this paper will use supporting examples from horticulture and agriculture but in no way is this intended to limit the intended audience. My hope is for the concepts raised to extend cross-disciplinary participation in collaborative explorations and to map out questions for further research and development rather than to argue for one point of view.

On an additional note, I have noticed the trend of my thinking towards a more empathetic engagement rather than a typical workplace get something accomplished angle. Upon further reflection, I don't think this is by accident. Rather I believe my thinking continued to develop along the opening themes of the course, including more possible understandings from a supportive rather than assertive stance.

Complexities of Collaborative Explorations: tensions, obstacles and opportunities

My personal interests reach far beyond my professional career in agriculture and horticulture to the broader context of how humans engage and define our relationships with nature and each other and the implications this has for the future of public horticulture, education, science, and policy concerning the environment and their social interconnections. In this context I've been interested in exploring the complexities and value of collaborative explorations: tensions, obstacles and opportunities.

For some background, Public Horticulture has found itself in a place of trying to help our audiences understand the science and possible social actions related to complex social issues such as climate change, a far cry from Public Horticulture's historic roles of supporting aristocratic entertainment, botanic collections, gardening "how-to" education, and improving public spaces for local communities. In the past century, we've been helping our audiences build their own home gardens, role-played as entertainment, and built connections and understanding of environmental ecosystems through public education. But we've also built extensive living and dried specimen collections, adding to the diversity of accredited museums, collaborated with biodiversity counsels, germplasm repositories, and ecological restoration projects. At the same time, Public Horticulture is struggling with revenue declines from private and public sources and asking questions about how we fit into and balance the current needs of our audiences while supporting our established missions. Some gardens have ventured into a more focused entertainment role, others look towards connections to biodiversity and ecology, and others are moving to the new frontier of "sustainability" without a clear understanding of what the term might mean to horticulture. We hear through public surveys that we are valued as an independent voice in a complex web of information. And through our numerous committees and exchanges within American Public Gardens Association (APGA) we see an increase in the number of public programs, articles and professional references we give across the domains of gardeners, the general public, the media and discussions among our peers as we attempt to find ways to engage these topics as they relate to the future role of public horticulture.

In our Western culture, Science has become a dominant method of inquiry into questions related to being human and part of a larger existence. And Science currently holds an association of unbiased, valiant exploration often giving rise to new knowledge through the scientific method. Other truths are less often validated in Western Cultures (see Appendix 1 for examples of agricultural origin stories). So it might be argued that horticultural science and related fields can help us find more "truthful" answers to our questions about how to take action and what information is most important to share. But here we still fail to recognize that scientists, as well as all human beings, are influenced by favored ideas of causality and are time-bound, biased organisms… and this has implications on what kinds of social actions are possible. "The spirit of the times" is such an apt metaphor "because it warns us that what we think and do, what we think we are, what we say about the world will be – all of these in part reflect influences that are time bound and hard to recognize…we breath the spirit of our times."[i] Science is biased, just as any other form of inquiry or sharing of knowledge.

So truth is in the context of our current state of mind and the metaphors implicitly and directly associated. "It was the arrival of written language that gradually marked a shift away from human beings feeling that they are participants with the earth, toward a more objective stance." Says Abram, "Our senses are not coupled, synaesthetically, to these printed shapes as profoundly as they were once wedded to cedar trees, ravens and the moon. As the hills and the bending grasses once spoke to our tribal ancestors, so these written letters and words now speak to us." Animism is not dead; it has just changed form."[ii]

Personal obstacles can get in the way too… some of which might be influenced by personal bias and others by those hidden beneath the surface of culture. As much as society and cultural values can frame our understanding of science (or of other aspects of life: social, economic, etc.) each individual and organization has the potential to realize our biases and reach beyond them to new understandings. There is often a cost of transition to new metaphors and understanding… time and struggle associated with new structuring of data or mapping of concepts. This struggle is a place of conflict between two seemingly opposed concepts… being in the here and now (being present in the moment) and planning for a future. These conflicts are both internal and external: internal from one person's state of focus and attentions to another's and in judgment of self, external in the expectation of others and the responsibilities of management, leadership and planning.

It's important to recognize that there is danger in being insular, so I'm hoping this discussion helps us find the value in divergent and multi-disciplinary thinking, new ways of thinking about the roles of agriculture, environmental stewardship and social structures beyond their historical roles, essentially creating a collaborative exploration of the topic assisting us in finding new connections and new solutions while keeping in mind the social relations, not just biological relations implicit in our work.

> *"The heart of dialogue is a simple but profound capacity to listen… this means listening not only to others but also to ourselves and our own reactions."*[iii]

Examples from horticulture and anthropology: climate change

"Public Horticulture" has defined itself as the intersection between people, plants and the varied horticultural activities that occur in public spaces. With this in mind, might horticulture be an intersection of social influence for seemingly non-horticultural problems? Outreach efforts often focus on "technology" or "hands-on" application of how to do horticulture rather than the implicit social aspects of horticulture, which in some complex situations might be perceived as preaching existing knowledge by providing services to populations who might not have ready local access. Building upon previously presented concepts, it's important to recognize that these truths are in the context of our current state of mind and the metaphors associated. As much as society and cultural values can frame our understanding of horticulture (or of other aspects of

life: social, economic, etc.) each institution has the potential to realize our biases and reach beyond them to new understandings.

For example, much of our audience has been comprised of people with disposable income, both historically and today. Rare coveted plants are often grown on the verge of their growing zones under glasshouse environments, encouraging friendly competition and camaraderie associated with collecting. Plants are often transported great distances as part of independent exchanges and large commercial operations. Pests and diseases have hitched rides around the world… something to consider in our voice concerning climate change.

A simple exploration about disease causation as it relates to horticulture and agriculture exposes an example of limiting possible solutions to seemingly biologic problems. Common to existing plant disease instruction the complexity of causation outside direct biological determinants is explored in almost every classroom. For example, it's very easy to blame *Alternaria solani* as the proximate factor in the cause of early blight in potatoes. Yet in plant pathology we are exposed to the idea that you must have three factors present in order for a disease to be present, often referred to as the disease triangle: susceptible host plant, a pathogen, and a favorable environment. Thus in this model multiple factors contribute to the appearance of a plant disease. "The existence of a disease caused by a biotic agent absolutely requires the interaction of a susceptible host, a virulent pathogen, and an environment favorable for disease development. Conversely, plant disease is prevented upon elimination of any one of these three causal components."[iv]

But what are often not critically discussed are the human social determinants in the spread and epidemiology of the disease. Yet we almost always relate how plant diseases have an effect on economics and social welfare of humans. In modern agriculture and horticulture, maximum yield practices and aesthetic preferences contribute to density and ease of transmission within a crop, forest or cityscape. Transportation of plants and foods over great distances increases potential transmission of pathogens and vectors. For example, "Factors driving the emergence and establishment of whitefly-transmitted diseases include genetic changes in the virus through mutation and recombination, changes in the vector populations coupled with polyphagy of the main vector, *Bemisia tabaci* [or silverleaf whitefly], and long distance traffic of plant material or vector insects due to trade of vegetables and ornamental plants. The role of humans in increasing the emergence of virus diseases is obvious. "[v] Human behavior is the most common factor that increases the probability of virus emergence.[vi]

So while none of this is new information and many scholars typically acknowledge the presence of human social determinants, critical thinking on this concept is not evident in the recommended cures often prescribed for plant diseases. Instead research focuses on new pesticides, improving plant health or breeding for resistance, all within the established socio-economic system. By challenging the myths of modern agriculture and attempting to examine the social determinants and group and individual psychological determinants related to disease causation in plants, we can expose the limited cure focus implicit of the disease triangle.

An exploration of public horticulture outreach efforts might help to open additional ways of thinking related to socio-economic complexities. Many public horticulture outreach efforts have typically materialized on terms preferred by the "giving" institution and not necessarily through shared discovery through open dialogue with local communities. Additionally it can be argued that many of the discussions around the table about how to help communities are implicitly biased towards the providing institution looking to selfishly demonstrate their goodwill. There is often a heirarchical structure that reinforces class division: institutions often hold the key to financial resources not available to the community without being subject to a relationship with an interested donor. And often times project successes are measured by subjective determinants reinforcing the institution's mission. So if we continue to focus on the "greenness" of horticulture in the context of current social issues, as we attempt to educate our audiences, we are limiting not only our own view of potential causes and societal implications, but we are also bias in the information we share.

If we follow this trend towards social issues, we might wonder how people from within any culture find themselves in very different views around causes. Cultural Anthropologist, Mary Douglas believes that any culture can be mapped on two dimensions, the extent to which behavior and rules are defined and differentiated (grid) and the extent to which people bond with each other and divide the world into insiders and outsiders (group).[vii] Four views are constantly held in tension and need each other.

- Hierarchy -governments, to every problem there is a solution as long as it is firmly enough implemented by powerful leader
- Individualism -the answers to problems is more freedom; the world is made and remade by the imagination and energy of individuals
- Egalitarianism -problems arise from too much hierarchy and inequality and not enough bonding and solidarity; more discussion with more people
- Fatalism –common among people with little power or experience of power

Using Grid-Group Theory and the topic of climate change, one of the current issues that horticulture finds itself trying to find ways to engage, M. Verweij offers several thought provoking implications. First, climate change issues can be argued from several different premises and that since these premises are rooted in different forms of solidarity, they will never agree. Second, this realization can be used to lay the groundwork of communication and problem solving. Each way of organizing and seeing the problem distils elements of experience and wisdom that are missed by the others. As Verweij so aptly states, "Each way of organizing and perceiving provides a clear expression of the way in which a significant portion of the populace feels we should live with one another and with nature. Each one needs all the others in order to be sustainable."[viii] It's interesting to consider that where we sit on this model might have more to do with how we see the world and possible solutions to problems than individual beliefs. So while surveys can give us data about what we think, they may not get at the root of the question why we think the way we do.[ix]

What is important to consider here for the purpose of discovering ways to bridge communication is not an attempt at reinforcing which of the four types an individual

finds essential to defining him/herself. But going deeper into discovering ways to think about or tease out the conditions behind someone displaying one of the four types.

How do we discover the multiple causalities? And then how do we engage based on new understandings?

It's important to clarify that in no way am I prescribing a singular method. Rather I hope to open up a dialogue of discovery akin to the realization that "the nature of social problems is such that they need to be solved continuously, and in different ways each time. One of the realities of the social world is the salience of values. To make positive use of the intractable nature of social problems and of historical perspective, one must understand that social action is always informed by contemporary values."[x] Suggesting that methods to solve them must be continuously explored and discovered, there is no right and wrong answer or method, rather it's quite possible there are multiple rights.

By opening dialogue with our communities beyond our prescribed and implicit biases, by opening ourselves up to our own selfish perspectives and by asking new questions… we might learn a few things from delving deeper into dialogues across lines of conflict. We might also trend towards new insights by asking communities how we might help empower local people to harness their own voices in finding solutions to creating and maintaining the solutions they seek. How can we be of service and how do I support people in their own work while supporting the work I do might be some of the most important questions and states of mind we can cultivate among our staff and institutional missions. Learning to listen and finding new intersections of engagement are very powerful practices and mind-sets that lead to embracing the full breadth of human life-long success. "Scientists who enter the world of social action like to think themselves possessed of the basic knowledge and problem-solving skills of their science, and they often have a feeling of virtue because they are applying these to practical social issues. What they fail to see is that because science does not start with the three problems, because it in no explicit way recognizes or is controlled by them, science qua science has no special expertise to deal with them… Science has learned a lot about problem solving, but when it looks beyond its confines to the arena of social problems, it has tended not to ask what the "basic" problems are there but rather to seek problems that fit its problem-solving style: clear problems that have unambiguously correct solutions. The separation of science from disciplines concerned with social history will always obscure from science that not all basic problems in nature can be molded to its problems-solving models."[xi]

So maybe we need to start by looking outside our narrow focus and acknowledge that some of our thinking might be false correlations, biased or better addressed in complex systems. We might look at ourselves from an outside perspective… for example, not as Horticulture, the "green" sustainable future, but in the current context of our environment and values shutting down the easy role of becoming answer devices. In the view of psychologists Louise Kidder and Michelle Fine, "the obligation of social scientists is to explain to the public that there is always more than one way to construe a social issue."[xii] They further suggest a role for the researcher as one who helps give voice to the victims

by telling the victims' stories rather than by presuming to speak for them. I'd like to think that horticultural institutions could also help give a voice to the social issues they engage without presuming to speak the only truth.

Maybe we can adopt/adapt Janet Stemwedel's 2012 article in Scientific American that suggests:

1. Confidence that your judgments are objective is not a guarantee that your judgments are objective, and your intent to be unbiased may not be enough.
2. If you want to build reliable knowledge about the world, it's helpful to identify your biases so they don't end up getting mistaken for objective findings.
3. If a methodologically sound study finds that science faculty have a particular kind of bias, and if you are science faculty, you probably should assume that you might also have that bias.
4. If you doubt the methodological soundness of a study finding that science faculty have a particular kind of bias, it is your responsibility to identify the methodological flaws.
5. If there's reason to believe you have a particular kind of bias, there's reason to examine what kinds of judgments it might influence beyond the narrow scope of the experimental study.

Reliable knowledge, or truth, is not without its own biases. For how can we say what is true without acknowledging what has shaped that truth… not just through scientific evidence, but also the associations and limitations of how we perceive truth and the methodologies we use to seek it. In working through this process, we can look at how we currently make efforts at sorting out truth from falsehood, and make an honest attempt at improving our critical thinking and awareness. And perhaps this is my own bias, but I believe that this will not necessarily devalue our work in the long-term. Rather, learning ways to open up our seeing to these possibilities can help us forge a new future that supports different ways of being.

Developing deep listening skills for oneself might be an opening into understanding the complexities of dialogue practice. But it's also important to note that developing a safe container to support the risks associated with vulnerability for oneself are the seeds to its growth. It's precisely in those moments of vulnerability that authenticity is revealed and deeper connections have potential. So vulnerability becomes strength through sharing. Brené Brown explores this concept of "The Power of Vulnerability" further in a TED talk from December 2011. In her candid talk about the discoveries of her research regarding human connection, she shares that in order for us to allow for connection, we have to allow ourselves to be really seen. And people who have a strong sense of worthiness, have a strong sense of love and belonging simply because they believe they are worthy. They have a sense of courage to be imperfect and the compassion to be kind to themselves. She believes that true human connection is the result of authenticity often disclosed through the face of vulnerability. The people in her study who had a strong sense of worthiness and deep connections with other human beings fully embraced vulnerability, "what made them vulnerable made them beautiful."[xiii]

It might be important to clarify; embracing vulnerability does not mean taking the position of sharing intimate stories with everyone you meet! Rather the essence emerging here is a sense that authenticity allows for meaningful connections and that how a person perceives vulnerability is an important mindset to their own worth and the worth of others.

One last method of finding insight into complexities of science-society relations might be to tease out strands of people, diagnosis, care, social support & regulation, advocacy, research/science, and wider social context as demonstrated in Appendix 3 as an exercise in diagramming intersecting processes. This is a teaching exercise developed by Peter Taylor at UMass Boston.[xiv] At first it might be easier to diagram events along a simple timeline. But it's more interesting to attempt this complex diagram picked apart into socio-biological strands and then attempt to find linkages among processes of different kinds and scales.

Communication: implicit understandings in Science

During the months of October and November 2012, I engaged a collaborative exploration with members of a college wide greenhouse best practices committee that evaluated the use of sustainability language in its mission statement. A quick search on the web for images related to sustainability demonstrates the implicit association of tending for the earth. But if you take this further, there is also implicit understanding that man is somehow able to control this system, that we have dominion, authority or charge to control the outcome, or at least assist it: hands support young seedlings or hold the globe, trees, plants and the color green dominate the visual metaphors: utopian images and colors, there is balance, inclusion and harmony, happiness and moral high ground. Ideas are implied that we are in a state of crisis, and we must join together to respond to that crisis; it's the new business motto.

Perhaps a common understanding of, or definition of, sustainability remained elusive because it is often linked with other concepts such as sustainable development or sustainable agriculture which can refer to a future intension or an action/practice related to both agricultural and environmental stewardship, healthy and nutritious food, socio-economic well-being, and growth. For many environmentalists, the idea of sustainable development is an oxymoron, as development seems to entail environmental degradation. We are still struggling with this dialogue of values. But I would also suggest that the concept of sustainability our group and the larger public are struggling over is in part due to the fact that it lacks common understanding through a basic human communication tool; it lacks a good cognitive metaphor.

George Lakoff has done extensive work on the concept of frames, which I've interpreted to metaphor. He suggests that these frames are built through a biologic process developed out of social reinforcements early in our lives and that by the age of 8 we have built a common set of frames by which we see the world. I'm not certain if he argues that these frames are built in a common culture or if they extend to all human beings. But I think he believes that many of them are common to all (i.e. we associate warmth with

affection since we are exposed to reinforcing experiences of being held my our parents). If you consider his use of the term "frame", metaphorically we have associations of enclosure, structure, highlighting something important and worthy of framing. So he is using this term carefully to imply common understanding that might help influence the thinking of his audience.

Both data and concepts can be represented through metaphors of words and art – visual metaphors, visual thinking through mapping, associations, etc. Sustainability implies we have choices and those choices have implications beyond something immediate. An exercise of creating metaphors by looking at symbols, word associations and antonyms can serve an opening to new understanding through new connections. Yet it's equally important to be aware that commonly understood and used metaphors may limit our seeing new possibilities. Perhaps too the closer a new metaphor is to an existing one, the easier it is to process and accept. The more it challenges a new mapping of understanding, the more difficult it is to accept. Considering broader implications, perhaps one of the "Frames" we learn later in life is how we expect science to conduct itself, both in the process of science and in the telling of science, unbiased. "Science" gives off a perception of being unbiased when in reality it always is (relate back to Agricultural Origin Stories Appendix). Every story is a story trying to help an audience see how another person sees. This is not an implication that we should not use metaphor. Rather we should recognize metaphor as present and influential to help recognize intention.

Another example from IQ tests

Why do we bother to argue about intelligence however it's defined? Perhaps it's because we are trying to have a measurement or prediction of future success as defined by our Western culture? Or perhaps we think we need a system to help us distribute resources equitably, also based in current social values? And while at the core a question of what can we do on the basis of science is worth asking, is it the only important question? Maybe the mere prospect of prediction and measurement of something we don't fully understand has its own set of problems and implications for individuals and society. Certainly I have some personal bias here because my partner's son has learning disabilities as defined by the US educational system. But in my own experience, intelligence is not the best determinant of success outside a narrow definition of success. The ability to gain and build knowledge and keep asking questions while working in successful relationships is also a very powerful practice and mind-set that leads to embracing the full breadth of human life-long success.

IQ tests contend to measure specific kinds of intelligence that predicts success within Western academic systems of learning, and some might suggest wealth and social status as the definition of success. But is this view related to success outside the academic system, into the "real world" of work-life, business, community engagement and human fulfillment? How do we use information… how do we apply knowledge and how do we continue to grow seem important questions left out of the IQ and standardized testing models common in our Western educational practices. With the ease of available

information passing over many forms of communication in our tech-savvy culture, might it be important to consider that how we analyze and apply this information to life is worth considering important to develop?

Appendix 2 examines implications of IQ testing reaching far beyond the intended purpose of measuring intelligence. Knowing your IQ helps reinforce a personal and shared story about your abilities and possible future. If we think about IQ as a measure of academic ability within a western culture and academic system, we might consider that IQ tests do not measure creativity; they do not measure "practical intelligence" (otherwise known as "street smarts"); and they do not measure what some psychologists call "emotional intelligence". The appended narrative examines why does being able to rank intelligence matter? After considering Ron Unz's argument about race, intelligence and wealth in the context of Western society, it might be interesting to consider that one motivating and biased factor in people placing so much attention on measuring intelligence might relate to justifying the cause and effect of success as defined in our predominant culture.

All this is building towards story

No matter the story, I am starting to see that it is possible that all stories reflect social structures, that they reinforce disconnection or connection to nature, social structures, cultural values and personal narratives within those contexts. They may even reveal the essence of gender bias represented in the culture where the story is born. This is in no way a judgment of right or wrong, rather a realization or awareness that might assist with thinking about how to prime conversations to look at the social relations of science and not just the biological systems. At this place in this discussion it's becoming apparent that there is danger in being insular. Collaborative explorations help us find divergent and multi-disciplinary thinking, new ways of thinking about the roles of agriculture, environmental stewardship and social structures beyond their historical roles… different but parallel, not right and wrong, just different rights. But there are weightier concepts behind creating effective collaborative explorations related to building empathy, building safety, inviting engagement and taking action based upon new understanding. Learning ways to open up our seeing to these possibilities can help us forge a new future that supports different ways of being.

Storytelling is a common method of communication central to the way humans' process information. And for this reason we should not be surprised that it surfaces in almost any scientific communication as well. In Western cultures, we may not at first recognize the connection since we typically define most storytelling as just that, "a story" without need for justification, validation or supportive data. But when we recognize that there are shared structures, we begin to open up the possibility that there is something underneath, something common to all human beings that might help us think more critically about implicit understandings and assumptions in research and science. If I can take liberty with William Issacs philosophy on developing good listening skills, following the disturbance… another form of listening, in this case could open up a more non-linear way of thinking about structures behind biological or other narratives. This relates back to my

paper Summer Semester 2012 on The Metacognitive Power of Storytelling[xv]… through the act of telling a story the storyteller learns more about him/herself and/or new connections that change the retelling of the story in the future.

According to Kottkamp, "Metaphor is a powerful and flexible means for reflection."[xvi] But storytelling and metaphor could also be considered a form of downloading, or telling yourself your own story and not being open to other possibilities. Yet story and metaphor often prove valuable tools for deepening meaning. An interesting dichotomy… is it a technique to opening or is it an obstacle? The key may be that story, if it's personal and is shared from a place of vulnerability, can be truly transformative.

> "The exceeding beauty of the earth, in her splendor of life, yields a new thought with every petal. The hours when the mind is absorbed by beauty are the only hours when we really live. All else is illusion, or mere endurance." ~ Richard Jeffries

What is emerging for me is an understanding that in order to best assist capacity for deep listening in dialogue, we need to open our hearts, first to self and then to others. We need to cultivate an intelligence of the heart. "Crossing the threshold from performance to practice will necessitate a shift of focus from the development of the intellect to an opening of the heart."[xvii] To borrow a metaphor from Michael Jones, we need to travel the path of developing a deep listening practice with a candle rather than a flashlight, allowing for the natural development from purpose.

Let the children play – and maybe we can learn a few things from them

As children are in the process of organizing the world for themselves, they have genuine curiosity unblemished by much experience. Adults have been through the process and often rely upon the system they've found to make the most sense… then continue to categorize, judge and make decisions based upon those right wrong dichotomies and systems. Curiosity fades because many adults don't actively engage in being open to possibilities but would rather feel safe in knowing. Artists may be the exception in our Western culture because we value the trait of creativity in this group of people. Brainstorming and other formatted inquiry seems to promote the concept of openness to new ideas and ways of thinking. But this openness is structured within the definitions of cultural expectations and differs in many ways to childhood free play and concepts of avid learning.

As suggested by Viviann Gussin Paley in her book The Boy on the Beach, play can be suggested as an act of creating metaphor.[xviii] As I've started to look for ways to bridge the internal and external conflicts of decision-making from within myself and when engaged in collaborative explorations, I've coined the metaphor *Play is a bridge*… it's a tool available in almost any place and time to bridge conflicts and keep attention in the moment. So while favorite quotes can also help bring awareness back to intent, they don't necessarily bring me into a place of presence and free exploration, a behavior

where real awareness and change takes place. Paley goes on to suggest, "Like children [PhD students], they were trying to establish their own interesting and provocative voices, eager to talk about what they hoped was a unique approach to an original proposal. But he [the boy named Eli] knows it is *his* work and must be given all his attention… Furthermore, like the adult researcher, he may make as many changes as needed to practice what he already knows and to imagine what the next steps might be."[xix]

Because of adult tendencies to desire being safe in knowing, it's interesting to consider Paley's observation that "The writer must get in touch with his reader by putting before him something he recognizes, which therefore stimulates his imagination and makes him willing to cooperate in the far more difficult business of intimacy. And it is of the highest importance that this common meeting place should be reached easily, almost instinctively, in the dark, with one's eyes shut."[xx] Putting something forth that begins as something they recognize might be a way of making an entry into space confortable for collaborative exploration and extension into territory not so comfortable. Thinking about this concept, it becomes equally apparent that participants in a collaborative exploration must become willing to cooperate in the business of exposing vulnerabilities, aspirations, and unformed ideas with self and each other.

> "To be part of the answers... means being willing to take risks, risks many of us find more frightening than physical danger. We have to risk being embarrassed or dismissed by friends or teachers as we speak out against deeply ingrained but false understandings of the world. It takes courage to ask people to think critically about ideas so taken for granted as to be like the air we breath. And there is another risk - the risk of being wrong. For part of letting go of the old frameworks means grappling with new ideas and new approaches. Rather than fearing mistakes, courage requires that we continually test new concepts as we learn more of the world - ever willing to admit error, correct our course, and move forward." ~ Francis Moore Lappé

New questions emerge:

Hopefully a further exploratory comparison of how children and adults learn will help to shed light on some of these newly discovered questions.

- How do we support building courage to be wrong in a culture where it is not valued?
- Beyond starting with self and supporting those close to us, are there other ways to build capacity for risk taking in collaborative explorations?

- Why would an audience want to become engaged?
- How do we frame research to include social aspects?
- How do we build environments of safety to support building of empathy and trust?
- How do we apply concepts of academic pursuit to Western cultural workplaces?
- Are there key moments in a person's or organizations life where information is important to the decision making process and other moments when the information itself has less to do with it?
- If you perceive yourself to be an outsider, less intelligent, or less educated, how likely are you to contribute to collaborative explorations?

In this narrative, I've attempted to share my thinking journey on the complexities of collaborative explorations. And while I used horticulture and other seemingly science based cases to unwrap my thinking, I have certainly not bound myself to any one concrete solution to building better collaborative explorations. Along the journey I have come to a place where I understand my own story better; what I realize now is that I have a deep desire to correct something traumatic to my experience of workplace community. I witnessed multiple failures of consensus building in the decision making process where others and I were left feeling trampled on or mislead. I suppose some part of me hopes there is a better way. Not that decisions cannot be made other ways and should be at times, but that somehow when collaborations are engaged, that people feel valued and heard in the process.

So I acknowledge that my paper is limited in how rounded the topic is explored with a bias coming through the refraction of my personal experience. This is where I am right now on this journey of thinking about ways to encourage more meaningful relationships through workplace interactions. There certainly is more work I can do on this topic and by no means is this final version of my thinking. It's simply a place in time with where my thinking is on the topic at hand and the complexities of the relationships behind them, the real world environment reaching for something more abstract and theoretical to help realize what is happening. I suppose the first step has been realized… that I have this bias. Now the work begins to learn how to move from here, open up my thinking and emotional risk taking through the process, how to let down my guard a bit and allow myself to truly witness the connections I'm finding… then realizing what I've neglected in the mandala of making space for taking initiative in and through relationships[xxi]. But I'm also starting to listen and value that the concepts of tools or techniques might be better termed strategies or currents for building foundations to support space. How-to is an easy discussion but has little real world value.

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Appendix 1

Biological origin stories and their structure Installment
Gender Bias in Agriculture: Awareness for Planning a Future

Modern-day industrialized agriculture is an institutional system where participation is divided by class and gender. In the United States, agricultural land and business ownership is predominantly represented by white males with most of the labor force represented by minorities, both men and women. In lower-income developing countries, males also tend to own agricultural land while women engage in the labor of the land. From the work I have been doing in my graduate studies in the Critical and Creative Thinking Program at UMass Boston, I started thinking about agricultural origin stories or historical accounts and wondering what structures might predominate in a cross-cultural sample. What is the story we know about the origin of agriculture? And what is the new story of agriculture we want to make?

Upon a full two days of looking for examples of agricultural origin stories, I found many examples of non-Western myths related to creation. For example:

> Kanati and Selu - The Origin of Corn and Game
> As Told by Wahnenauhi (Lucy Lowery Hoyt Keys)
>
> *"A man and a woman reared a large family of children in comfort and plenty, with very little trouble about providing food for them. Every morning the father went forth and very soon returned bringing with him a deer, a turkey, or some other animal or fowl. At the same time the mother went out and soon returned with a large basket filled with ears of corn which she shelled and pounded in a mortar, thus making meal for bread.*
>
> *When the children grew up, seeing with what apparent food was provided for them, they talked to each other about it, wondering that they never saw such things as their parents brought in. At last one proposed to watch when their parents went out and to follow them.*
>
> *Accordingly next morning the plan was carried out. Those who followed the father saw him stop a short distance from the cabin and turn over a large stone that appeared to be carelessly leaned against another. On looking closely they saw an entrance to a large cave, and in it were many different kinds of animals and birds, such as their father had sometimes brought in for food. The man standing at the entrance called a deer, which was lying at some distance back of some other animals. It rose immediately as it heard the call and came close to him. He picked it up, closed the mouth of the cave, and returned, not once seeming to suspect what his sons had done.*
>
> *When the old man was fairly out of sight, his sons, rejoicing how they had outwitted him, left their hiding place and went to the cave, saying they would show the old folks that they, too, could bring in something. They moved the stone away, though it was very heavy and they were obliged to use all their united strength. When the cave was opened, the animals, instead of waiting to be picked up, all made a rush for the entrance, and leaping past the frightened and bewildered boys, scattered in all directions and disappeared in the wilderness, while the guilty offenders could do nothing but gaze in stupefied amazement as they saw them escape. There were animals of all kinds, large and small - buffalo, deer, elk, antelope, raccoons, and squirrels; even catamounts and panthers, wolves and foxes, and many others, all fleeing together. At the same time birds of every kind were seen emerging from the opening, all in the same wild confusion as the quadrupeds - turkeys, geese, swans, ducks, quails, eagles, hawks, and owls.*
>
> *Those who followed the mother saw her enter a small cabin, which they had never seen before, and close the door. The culprits found a small crack through which they could peer. They saw the*

woman place a basket on the ground and standing over it shake herself vigorously, jumping up and down, when lo and behold! large ears of corn began to fall in the basket. When it was well filled she took it up and, placing it on her head, came out, fastened the door, and prepared their breakfast as usual. When the meal had been finished in silence the man spoke to his children, telling them that he was aware of what they had done; that now he must die and they would be obliged to provide for themselves. He made bows and arrows for them, then sent them to hunt for the animals which they had turned loose.

Then the mother told them that as they had found out her secret she could do nothing more for them; that she would die, and they must drag her body around over the ground; that wherever her body was dragged corn would come up. Of this they were to make their bread. She told them that they must always save some for seed and plant every year."

From James Mooney's History, Myths, and Sacred Formulas of the Cherokees, from the 19th and 7th Annual Reports of the Bureau of American Ethnology. The material in this book was collected from Cherokee sources between 1887 and 1890.

Among the Ojibwa, the Father of Indian Corn puts the origin of agriculture in the hands of a young man's quest, struggle and sacrifice to bring comfort to his family and people struggling for food (http://www.indigenouspeople.net/fathcorn.htm).

The Western story of the origin of agriculture follows a historic account of domestication from archeological evidence. Several theories (and I'll take liberty here to suggest that these theories are a sort of story) are outlined neatly at Wikipedia (http://en.wikipedia.org/wiki/History_of_agriculture). If examined closely, these theories also represent social values of the time and place they were developed. For another story, I've started to look into Mennonite stories about farming and the social structure that this story reinforces. In a couple of personal accounts, gender bias becomes evident when men and women, both with the same reasoning of supporting the family farm, experience the reality of "working out" differently.

No matter the story, I am starting to see that it is possible that all the stories reflect social structures, that they reinforce disconnect or connection to nature, and they may even reveal the essence of gender bias represented in the culture where the story is born. This is in no way a judgment of right or wrong, rather a realization or awareness that might assist with planning and evaluating the future direction of agricultural research foci and extension outreach at NYSAES and CALS.

And while industrialized agriculture seems to support a predominantly male world-view preference, family farms, organic gardening, sustainable agriculture, and permaculture all support a divided male-female gender bias with these "alternate" farming methods falling into a more nurturing female association that embrace farming practices that mimic natural ecological processes. Beyond these practices, the philosophy of sustainability also advocates social equalities and just treatments of people and environmental systems.

Because we are a land grant university with a strong directive for diversity and inclusion from Cornell, I believe we would be serving our audiences best if we not only keep an awareness of the gender bias in agriculture, but that we continue to question whether the research and extension work we do reflects or even intentionally implies a gender bias. Is

it possible we are reinforcing gender bias in the idealism of future agriculture through these stories?

Maybe we can adopt/adapt Janet Stemwedel's 2012 article in Scientific American that suggests:

1. Confidence that your judgments are objective is not a guarantee that your judgments are objective, and your intent to be unbiased may not be enough.
2. If you want to build reliable knowledge about the world, it's helpful to identify your biases so they don't end up getting mistaken for objective findings.
3. If a methodologically sound study finds that science faculty have a particular kind of bias, and if you are science faculty, you probably should assume that you might also have that bias.
4. If you doubt the methodological soundness of a study finding that science faculty have a particular kind of bias, it is your responsibility to identify the methodological flaws.
5. If there's reason to believe you have a particular kind of bias, there's reason to examine what kinds of judgments it might influence beyond the narrow scope of the experimental study.

At first I was hoping this exercise would help us build reliable knowledge while serving our audience with the best science we can provide. But reliable knowledge, or truth, is not without its own biases. For how can we say what is true without acknowledging what has shaped that truth… not just through scientific evidence, but also the associations and limitations of how we perceive truth and the methodologies we use to seek it. In working through this process, I'm hoping we can look at how we currently make efforts at sorting out truth from falsehood, and make an honest attempt at improving our critical thinking and awareness. And perhaps this is my own bias, but I believe that this will not necessarily devalue our work in the long-term. Rather, learning ways to open up our seeing to these possibilities can help us forge a new future for agriculture that supports different ways of being.

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Appendix 2

What do IQ tests measure and why do we care?

We all know that some people seem to excel at one sort of mental activity while failing miserably at others. Yet the notion of intelligence seems so widespread and deeply entrenched… but what do we really mean? If we think about IQ as a measure of academic ability within a western culture and academic system, we might compare SAT, PSAT and other standardized testing methods to the same questions and analysis as IQ tests. Do any of these measure any sort of fixed, innate intelligence? For example, "the best-known IQ battery, Stanford-Binet 5, measures Fluid Reasoning, Knowledge, Quantitative Reasoning, Visual-Spatial Processing, and Working Memory."[xx] So this might suggest, among other things, that IQ tests do not measure creativity; they do not measure "practical intelligence" (otherwise known as "street smarts"); and they do not measure what some psychologists call "emotional intelligence".

Thomas Riggins and other people argue that IQ tests measure a person's "motivation" and the likelihood of future success. And by "motivation" is meant "that of the person being tested for taking the test itself".[xx]

Howard Gardner's work on the concept of multiple intelligences had a profound impact on Richard Louv's concept of "nature intelligence". Gardener's list of seven intelligences includes: linguistic, logical-mathematical, musical, bodily-kinesthetic, special, interpersonal, and intrapersonal.[xx] Richard Louv suggests, "Our society seems to look everywhere *but* the natural domain for the enhancement *of* intelligence."[xx] Here Louve and Gary Stix are referring to the increased usage of neuroenhancers, or smart drugs among college students. Louve goes on to suggest that "the study of the relationship between mental acuity, creativity, and time spent outdoors is a frontier for science… exposure to the living world can enhance intelligence for some people… our senses and our sensibilities are improved through our direct interaction with nature (and practical knowledge of natural systems is still applicable in our everyday lives); second, a more natural environment seems to stimulate our ability to pay attention, think clearly, and be more creative, even in dense urban neighborhoods."[xx] Rachel and Stephen Kaplan have done research that relates back to this concept finding after a 9-year study for the U.S. Forest Service that nature experiences help with recovery from mental fatigue and improves the brain's ability to process information. And I'll have to read more about their methods and findings to make any connections of my own.
But the larger question I raised at the start of this post now materializes… why does being able to rank intelligence matter? After considering Ron Unz's argument about race, intelligence and wealth in the context of Western society, it might be interesting to consider that one motivating and biased factor in people placing so much attention on measuring intelligence might relate to justifying the cause of success as defined in our predominant culture.

Is there another approach to learning that relates to our current needs for innovation and creative thinking in our society to solve complex issues?

IQ tests contend to measure specific kinds of intelligence that predicts success within Western academic systems of learning, and some might suggest wealth and social status as the definition of success. But is this view related to success outside the academic system, into the "real world" of work-life, business, community engagement and human fulfillment? How do we use information… how do we apply knowledge and how do we continue to grow seem important questions left out of the IQ and standardized testing models common in our Western educational practices. With the ease of available information passing over many forms of communication in our tech-savvy culture, might it be important to consider that how we analyze and apply this information to life is worth considering important to develop? Social issues are rarely simple. And knowledge based upon scientific inquiry often has real world social implications. Building knowledge is part of the process of problem solving but the ability to gain knowledge and keep asking questions while working in successful relationships is also a very powerful practice and mind-set that leads to embracing the full breadth of human life-long success.

I would suggest that the implications of IQ testing reach far beyond the intended purpose of measuring intelligence. Knowing your IQ helps reinforce a personal and shared story about your abilities and possible future.

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Appendix 3

Diagramming of Intersecting Processes
(a teaching activity under development)
Peter Taylor, Draft 8 Feb 2004; revised 17 April 2005; revised 6 Nov 2012

Acknowledgement: This unit draws inspiration and some ideas from Matthew Puma's adaptation of my teaching about intersecting processes in CrCrTh 640 http://www.faculty.umb.edu/pjt/640-02.html) during Spring 2002.

Goals for students
1. to understand the development of biomedical and social phenomena in terms of linkages among processes of different kinds and scales that build up over time—genetics, treatment, family and immediate social context, social welfare systems and economics, wider cultural shifts, ….

2. to use graphic organizers to help them visualize such "intersecting processes" and to identify places where detail is missing and where further inquiry is needed.

3. [depending on level of students and prior preparation] to contrast the implications of thinking in terms of direct causation (like spokes going to a hub) with "heterogeneous construction," my term for the following ideas:
"a) Without any superintending constructor or outcome-directed agent,
b) many heterogeneous components are linked together, which implies that
c) the outcome has multiple contributing causes, and thus
d) there are multiple points of intervention or engagement that could modify the course of development. In short,
e) causality and agency are distributed, not localized. Moreover,
f) construction is a process, that is, the components are linked over time,
g) building on what has already been constructed, so that
h) it is not the components, but the components in linkage that constitute the causes.
Points c) and f–h) together ensure that
i) it is difficult to partition relative importance or responsibility for an outcome among the different types of cause (e.g., 80% genetic vs. 20% environmental). Generally,
j) there are alternative routes to the same end, and
k) construction is "polypotent," that is, things involved in one construction process are implicated in many others. Engaging in a construction process, even in very focused interventions, will have side effects. Finally, points f) and k) mean that
l) construction never stops; completed outcomes are less end points than snapshots taken of ongoing, intersecting processes" (Taylor 2001).

Instructions
Pre-session reading:
Paul, D. (1997). Appendix 5. The history of newborn phenylketonuria screening in the U.S. Promoting Safe and Effective Genetic Testing in the United States. N. A. Holtzman

and M. S. Watson. Washington, DC, NIH-DOE Working Group on the Ethical, Legal, and Social Implications of Human Genome Research**:** 137-159. http://biotech.law.lsu.edu/research/fed/tfgt/appendix5.htm

Excerpt from from Taylor (2001 or 2004) on the development of severe depression in a sample of working class women.

Phase A: Mini-lecture to introduce the ideas under goals 1 and 2 and the use of diagrams to identify missing detail (goal 3). Illustrated with diagrams of a) the development of severe depression in a sample of working class women and b) the life-course of a female with PKU detected by neo-natal screening for PKU (based on Paul 1997) and perhaps other cases. Followed by Question & Answer.

Phase B: Following the procedure below, diagram Paul (1997) article with respect to the routinization of neo-natal screening for PKU in the United States. Followed by discussion of potential and limitations of the diagramming activity (for discussion among colleagues or for teaching).

1. Identify important connections mentioned in the article between things in the following categories or strands (open to adaptation): Experience of persons with PKU (condition, care, social support); Advocacy (pro + con); State mandates & regulation; Research; and Wider social context.
2. Arrange the things as well as you can given the information available on parallel strands according to year (from 1930s to 1990s allowing more space for 1960 through 1980).
3. Draw dotted lines to show connections between things.
4. Identify connections about which you want to know more. Use the ideas under goal 3 as a checklist.
5. Note where these instructions were hard to put into practice.

Example of connection: enthusiasm for biomedical prevention of mental retardation over education/social support/rehabilitation of retarded persons (wider social context) and promotion of PKU screening in advance of research on effects of diet (state mandates & regulation/ research).

share products & comment on them at http://crcrth645.wikispaces.umb.edu/-/2012/shared2/home

Phase C (Advanced): Move from developing categories to interconnected strands for the explanation given by a) Dickens and Flynn in APA (2001) for the generation-to-generation increase in IQ test scores; or b) Barker as described in Taylor (2004) for early-life origins of chronic diseases of later life.

First attempt at diagramming intersecting processes from PKU materials