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What are the portals through which we uncover new perspectives, new approaches and new audiences for sharing our scholarship? The scholarship of teaching and learning creates opportunities for the emergence of new communities of practice across disciplines. Specific “portals of engagement” invite new partnerships for engagement, along with the emergence of “hybrid pedagogies” that evolve from Schulman’s (2005) signature pedagogies. How effective are these hybrids? What are the common elements that catalyze learning during the process of engagement? This essay explores these portals and their role in fostering scholarship across disciplinary and cultural pedagogies.

Keywords

Communities of practice, Portals of engagement, Hybrid pedagogies, Visuality, Metavisualization

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Communities, Voices and Portals of Engagement

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Abstract

What are the portals through which we uncover new perspectives, new approaches and new audiences for sharing our scholarship? The scholarship of teaching and learning creates opportunities for the emergence of new communities of practice across disciplines. Specific “portals of engagement” invite new partnerships for engagement, along with the emergence of “hybrid pedagogies” that evolve from Schulman’s (2005) signature pedagogies. How effective are these hybrids? What are the common elements that catalyze learning during the process of engagement? This essay explores these portals and their role in fostering scholarship across disciplinary and cultural pedagogies.

Keywords: communities of practice; portals of engagement; hybrid pedagogies; visuality; metavisualization

Introduction: The Silk Road Project

I begin this paper with a brief anecdote that resonates with the themes of this essay. Earlier this year, a good friend invited me to a local concert featuring the great cellist Yo-Yo Ma’s Silk Road Ensemble. The Silk Road Ensemble’s performances are distinct from Ma’s traditional Western classical repertoire. The Ensemble is part of the Silk Road Project (1998) which takes its name from the historic trade network that traversed Eurasia for 2000 years. The routes of the Silk Road enabled the exchange of art, ideas, information and innovation between so many cultures – resulting in the first global exchange of scientific and cultural traditions. Yo-Yo Ma has called this network the “internet of antiquity”, and it provides a rich metaphor for his Ensemble project, which connects artists, students and audiences around the world to explore, share, blend, create and learn old traditions with new knowledge and innovations. In effect, it is a Community of Practice committed to an inclusive artistic pedagogy that transcends cultural, geographical, and temporal boundaries.

In an introduction, one of the musicians described bridging time and space in the Ensemble’s explorations and collaborations of East and West. I found myself curiously drawn to this music, which was unlike any I had ever heard – indeed, it was a unique blend integrating cultures, genres and time periods. What struck me in particular, however, is the conversation I had with my friend, Pam, during intermission. In her reaction to this music, Pam described having a curious mix of thoughts and emotions—she said, “I was excited and intrigued by this ‘intrusion’ to my cognitive and emotional repertoire. But at the same time, my excitement and attraction to the music was tempered by a feeling of uncertainty with where the music was going.” This was unfamiliar terrain for Pam - different rhythms, a unique succession of musical phrases and notes, and she said she could have given up on it, but the initial excitement and attraction prompted her to hang on, and put trust in the music, the musicians, and in herself. Part of Pam’s experience, and perhaps that of others who have been connected through the Silk Road project, is what Bass and Eynon (2009) call the *embodied nature of learning* - the expansive range of learning in which understanding is experienced

through the body as well as the mind, giving voice to sensual and emotional dimensions. Participation in a Community of Practice extends the repertoire of these experiences, and yields new interpretation and meaning.

The above anecdote serves as an introduction to sharing my perspectives on the Silk Roads of the scholarship of teaching and learning, and what it is that initially grabs us – what I call portals of engagement - to come together and trust the community, the experience and ourselves. Part of this trust develops from the recognition and affirmation of new sensory inputs that we don't routinely take into account in our cognitive or affective pedagogical frameworks - whether they are new musical blends as in Pam's case, or new visual modes of learning in pedagogies that are traditionally not informed by visual literacy. In the process, I wish to highlight the significance of "voice" (i.e. who's "voice"?) and the implications of the responsibility we have in unknowingly privileging particular voices, including our own.

Deep Engagement: Learning to Be a Full Participant

Members of a Community of Practice (CoP), including Yo-Yo Ma's Silk Road Project are deeply engaged, and this palpable engagement fosters learning and mastery. John Seely Brown and Richard Adler note that mastering a field of knowledge involves not only "learning about" the subject matter but also "learning to be" a full participant in the field. What does "full participation" mean? It means acquiring the practices and the norms of established practitioners in that field – the experts – and acculturating into a CoP. And, active participation in the practices of the community fosters the development of an identity in relation to the community and the field.

CoPs serve as frameworks or models for creating an iterative succession of experiences that give learners increasing levels of expertise. Each successive experience also builds habits of mind, increasing trust in the community and in oneself, and incorporates perspectives beyond the community. Such frameworks also redefine the traditional boundaries of the course curriculum. They allow us to develop the course as a set of experiences that extend beyond the syllabus and the physical and temporal confines of the classroom or institution.

So what catalyzes the formation of engaged communities in higher education? What nucleates them? What framework did the Silk Road Ensemble build upon to become an organic, inquiry-driven community that succeeds in extending boundaries while creating safe learning environments? The formation of a CoP is often based on disciplinary or professional interests or a societal need. However, sometimes CoPs arise via some unique event, circumstance, or even artifact, which catalyzes the coming together of novel partners.

I'd like to discuss some examples of what I call "**portals of engagement**", which are the catalysts, or "nucleating agents" for new partnerships. These portals are transformative, because they merge participants or practitioners from different domains, and the pedagogical structure of the community is a hybrid of the domains or disciplines that comprise it.

Portal 1: Perry Visits Japan

Several years ago, a serendipitous event opened the way for a community of scholars, teachers and students to develop around an artifact - a rare scroll. Susan Smulyan, a Professor of American Civilization at Brown University, had invited a colleague from Japan, Professor Masako Notoji, to give a seminar. When Professor Notoji failed to show

up for her next scheduled appointment, Susan went in search for her at her last known destination - the John Hay Library, which houses the university's collection of rare books and manuscripts. It was there that Susan found her excited colleague poring over a Japanese scroll, completely enthralled and delighted with her serendipitous fortune to examine the beautiful and rare document. "This is a national treasure!" she exclaimed. The scroll, entitled "*A Request for a Good Relationship*,"¹ was painted by an anonymous Japanese artist sometime between 1854 and 1906, and it illustrates Commodore Matthew Perry's landing in Japan, the first official contact between Americans and Japanese. The rare scroll is indeed a beautiful collection of twelve watercolor panels depicting a succession of events in great detail, including individual human gestures and postures.

A CoP developed from Susan's desire to share the excitement of the scholarship around this artifact with her students. The scroll provided the portal through which Susan eventually brought together a community of students, librarians, historians and teachers to actively integrate Boyer's four scholarships – the scholarship of discovery, the scholarship of integration, the scholarship of application, and the scholarship of teaching and learning – in the explorations and interpretations of the scroll. Hence, the digital community of scholarship, *Perry Visits Japan: a Visual History* (Smulyan, 2004; <http://dl.lib.brown.edu/japan/>) was created by Susan, her students and colleagues.

To mirror the Japanese scroll, Susan also added images from the lithographs of William Heine, who was the official artist of the Perry expedition - the "American" view of the same events. So Susan was also conscious about "voice" – and providing the community with the opportunity to "hear" different voices about Perry's landing. There is also the "voice" of a Chinese scholar, Wang Zhiben, who wrote an inscription at the beginning and the end of the scroll at a later date, and reveals the Asiatic attitudes towards western colonialism at that time. Interestingly, I use the term "voice", but the actual "input" – the perspective – is being provided in visual and narrative forms. Susan's desire to continue to include other "voices" has encouraged her to branch the portal out to her colleagues and students in Japan, to invite their reflections and interpretations.

What may have started out as the idea for a course expanded into a teaching and learning commons, where student engagement in the process of inquiry enhanced the understanding of both learners and teachers. In this commons, the individual scholar is removed from a position of expertise and in Susan's words, this de-centering of research and analysis makes the materials available to a broader community of practice.

The scroll, as a portal, led to the emergence of a **hybrid pedagogical framework** based on collaborative scholarship that embraced open-endedness and interactivity as historical insight and practice. A hybrid pedagogy is an actual hybrid of the cognitive and sensory frameworks and processes that define what Lee Shulman (2005) has called "signature pedagogies." Signature pedagogies are the ontologies of teaching that organize the ways in which future practitioners are educated for their professions- e.g. the case-dialogue method in law; the critique, or "crit" in art and design. Shulman has described signature pedagogies as sharing four distinctive features: they are pervasive, routine, habitual, and deeply engaging for students. When a hybrid pedagogy emerges, the habitual and routine practices of the respective signature pedagogies are disassembled, and then subsequently conceptualized and contextualized into new cognitive domains. Susan's community of practice gave rise to a hybrid pedagogy that has extended the traditional boundaries of history scholarship through inclusivity and collaborative voice. Her pedagogical framework invited multiple lenses for analysis and

¹ Metadata record available at: <http://dl.lib.brown.edu/metsrecords/1073496752687500.xml>

critical discourse. Like the Silk Road, *Perry Visits Japan* also bridges time and space through the 21st century students' reactions to the visual images in relation to the reaction of the Japanese artist and the Chinese scholar in the 19th century.

Portal 2: Design Studio + Genomics: From Visuality to Visual Literacy

The late mathematician and biologist Jacob Bronowski (best known as the writer and presenter of the BBC series *The Ascent of Man*) stated: "There is a likeness between the creative acts of the mind in art and in science" (Bronowski, 1956). A number of years ago, when I was a faculty member at the University of New South Wales in Sydney, Australia, I impulsively decided to attend a seminar about graphic design education in the College of Fine Arts because at the time, I knew nothing about signature pedagogies of the visual arts and I was curious.

Rick Bennett, a faculty member in the graphic design department, talked about connecting students globally to collaboratively engage in the creative process of the design studio. He described the salient elements of visual collaboration in an online platform, and as he spoke, I became intrigued and excited. I was excited because the deep engagement and collaborative synthesis in the virtual design studio was something I had desperately wanted my undergraduate biology students to be able to experientially understand ever since I started teaching. As Brown said, I wanted them to be a full participant in the field.

The signature pedagogy for graduate research in biology is an apprenticeship model. As the professor, or head of the laboratory, I have graduate students, undergraduate honors students, postdocs, and perhaps research assistants all working together as a team, each contributing his/her own individual research toward solving a larger continuous "puzzle". And of course, we are connected to an even broader community of practice in our field, where we often collaborate with other researchers in other laboratories.

But in the classroom, undergraduate students rarely experience the excitement of real research - this is because the signature pedagogy of traditional introductory level undergraduate biology remains constrained to the large lecture and pre-designed lab class. More institutions today are implementing open inquiry laboratory courses, but it is still a challenge to create an authentic, open-ended, interdisciplinary experience in the introductory undergraduate classroom. Dunbar (1997) argues that naturalistic studies of scientific practice (that is, cognitive studies of how scientists think and solve problems) require the process to be examined in an authentic setting whereby scientists solve complex, extended scientific problems as they interact with colleagues and with resources in their research environment. In other words, a true cognitive apprenticeship must engage the student in what biologists would qualify as an *in vivo* (natural) setting as opposed to an *in vitro* setting (synthetic environment). In my case, the challenge of creating a stimulating, tangible experience around the topic I was teaching at the time, genomics, was seemingly daunting. For an undergraduate to "see" and experience the excitement in the analysis of thousands of letters of genetic code was too abstract. What is the "societal value" of genomics? How could I foster the deep engagement of my own research group amongst students with diverse interests and needs?

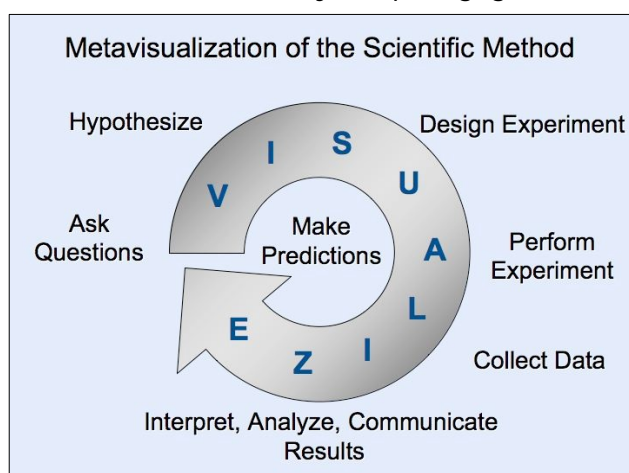
Rick mapped the process of translating the design studio to an online community of practice. He described the collaboration and interaction between students who worked in creative teams, fluidly transcending geographical location, and differences in culture, age or discipline. The focus of his pedagogy was on the creative, cognitive and communicative processes, and not the products. The design studio became my portal of engagement. As Bronowski's words indeed signify, both Rick - the designer, and I - the

scientist, set our focus on the process of creative engagement as the organizing principle for the pedagogical framework. And so, Visualizing the Science of Genomics (Takayama, 2003, 2005; http://au.omnium.net.au/tours/vsg_2003s1/base/menu.php.html) was created as a collaboration between scientist and graphic designer. VSG was an international online student research community whereby each member of a research team was based in a different country and was majoring in a distinct disciplinary field. In bringing together these multidisciplinary teams, I wanted students to experience research as a concerted global effort dependent upon contributions by scientists with specific areas of expertise. Furthermore, as research communities are built on the efforts of a broad range of students and professionals at various stages in their career, VSG was open to students at all levels and participants ranged from first year undergraduates through to postgraduate medical students. The teams collaborated to predict, visualize, formulate and analyze models from genomic sequences. The research was meaningful because the teams were working on case studies based on real data and they - the students - were directing it. *They* came up with the research question after analysing the available information and data. *They* developed their own methodology for investigating the problem and making it, and the possible solutions, “visible”. VSG was a Community of Practice in which students took ownership of their learning through collaboration, trust and shared goals, and the values of the community created an environment that fostered the creative and reflective process of scholarship. The virtual science studio celebrated social interaction, dialogue, process and critique to promote open-ended collaborative inquiry. All of these interactions pivoted around the creation and analysis of visualizations that modeled the teams’ interpretation and application of genomics.

VSG as a Hybrid Pedagogy

As in Susan’s *Perry Visits Japan* project, VSG became a community of practice that gave rise to a new hybrid pedagogy. The integration of visual thinking and scientific thinking required me – the instructor – to be able to identify and provide appropriate support and facilitation. I soon recognized the need to scaffold visual literacy as an integral component of scientific literacy. The student participants were actively involved in creating the hybrid pedagogy because they were blending cognitive mental spaces in their community of practice. A mental space, as defined by Fauconnier and Turner (1998; 2002), is a small conceptual packet assembled for purposes of thought and action. Blending occurs when the mind combines two or more mental spaces to make sense of these discrete inputs in new, emergent ways. The new emerging framework is different from that of either of the mental spaces that contributed to it. The hybrid pedagogical framework in VSG emerges from the blending of visual literacy and scientific inquiry. My students were also “thinking visually” and integrating this with scientific deduction. My own thinking with regard to this hybrid pedagogy is best expressed visually as (at right):

As a teacher, this meant that not only did I recognize the need to teach and facilitate visual literacy, but I also needed to raise their visual awareness - their metavisual skills. I needed to develop my own awareness of visual language and to learn from my artist colleagues how to teach my students to “see”, to visualize, and to communicate visually in a scientific context. This was quite exciting for me - because none of my own science professors had ever taught me how to see and how to communicate visually. Yet the sciences *are* indeed visual and



science students learn to see through apprenticeship, exposure and experience. My pedagogical practice was transformed from the VSG project in that I became purposeful in creating and applying visualizations. My own metavisual awareness was switched on, and indeed my cognitive organization was influenced through this process.

I also came to recognize my pedagogical responsibilities and potential biases in the way I used visualizations and visuality. I therefore decided to get some hard data about how well (or not) my students were interpreting complex visualizations. I worked with an honors student, Karen See, in collaboration with cognitive scientist Barbara Tversky and educational researcher Jan Plass to find out whether students were able to comprehend three-dimensional (3D) representations better than two-dimensional (2D) representations, and whether certain visual abilities differed amongst these students (Takayama, Tversky, & Plass 2003).

One of the important outcomes from this study was that the spatial ability of my students impacted on their ability to interpret and apply both 2D as well as 3D formats. However, it is known that spatial ability can be taught. For me, this meant that I needed to carefully structure complex molecular representations in a systematic way to scaffold my students' visual literacy. The research also revealed that lower level learning (on Blooms' taxonomy) is better when visual representations are presented in 2D than in 3D. This made us realize that sometimes simpler is better. These studies have been crucial for the continued development of my hybrid pedagogical framework, to inform my ability to integrate the teaching of visual competence. Ultimately, the goal is to promote deep scientific understanding that is reinforced by increased visual literacy throughout the entire process. The purposeful, strategic visual skills that are instinctive and natural to my graphic design colleague need to be dissected and reassembled as integrated components of scientific literacy.

There are certainly other examples of portals that have catalyzed similar transformative partnerships and the creation of CoPs. I view portals of engagement as having the following characteristics:

- They uncover new perspectives and/or approaches for engagement
- They invite new audiences and partnerships
- They lead to the emergence of hybrid pedagogies
- They have temporal flexibility – Silk Road; Perry; Visualization in post-genomics era

Moreover, the hybrid pedagogies that emerge from these portals share the following characteristics:

- They lead to the empowerment of ideas (see Papert, 2000)
- They lead to the empowerment of voices
- They are "dendritic" – that is, like the cells of the neural network, they branch out, they are receptive to a range of incoming signals, and they function to amplify signals.
- They are "symbiotic" – the interdependence of the original pedagogies that form the hybrid pedagogy facilitates cognitive blending and risk-taking.

From a practical sense, if one were to consider the appropriate assessments that were indeed authentic for a course that is based on a hybrid pedagogical framework, do we need to apply Fauconnier and Turner's principles to the assessment rubric? Or do we revert back to the distillation of the discrete components that evolved into the hybrid framework?

The Empowerment of Voices

Finally, I would like to revisit an earlier point about whether and how we might unknowingly privilege a particular "voice(s)" through a given pedagogical framework. How do we take responsibility for the way in which knowledge/information/the medium is organized? What are the individual, institutional, cultural, educational and historical biases that we bring to the curriculum and what biases are embedded within our epistemological understandings?

We are presumably educating our students to be citizens of a global society and institutions prioritize internationalization. Yet, I find that even at international conferences on the scholarship of teaching and learning, the Western framework (and more often than not, the American framework) is pervasive in the academe - the conceptual, cultural and pedagogical contexts are taken for granted and assumed universal. As an American who also happens to have spent 14 years of my academic career in Australia, I have become acutely attuned to how my own "voice" has evolved in relation to my social, cultural and institutional environs. Just as the students negotiate meaning through interactions within communities of practice, the professor becomes a more effective communicator and teacher by widening those portals for inclusive student engagement and dialogue. Even in the sciences, which are perceived to be "unbiased" disciplines, the framework for the signature pedagogy is indeed inherently and unavoidably linked to the social and cultural contexts of Western and non-Indigenous societies. And this can act as structural barriers for students and even for some of our colleagues.

As educators, we have a responsibility for the way in which knowledge is framed and organized. I can recall a transformative moment at the beginning of a featured panel at the 2007 Conference of the International Society for the Scholarship of Teaching & Learning in Sydney, Australia. Professor Aroha Yates-Smith, a Maori woman, was invited to speak about Indigenous epistemologies and knowledges. The Maori are the Indigenous people of New Zealand. Professor Yates-Smith began by acknowledging the traditional owners of the land, the local people and environment, and introduced herself and her background in the Maori language. In so doing, she created a link between the place, the people and the audience with her own background and place of origin. She set a pace and tone for the session that was graciously inclusive and respectful. It was transformative because it connected all of us at a spiritual and human level, which is not part of our daily academic culture. And we became aware of the implications for some of the biases in our knowledge structures.

I began this essay with the Silk Road and the bridging of time and space. Time and space hold a different significance for Maori. Maori are constantly perceptive of history, living deeply in time, so that everything in the physical world provokes remembering – rather than focusing on the immediate and concrete spatial world and its possibilities (McKay, 2004). Our Western classification of spaces - including architectural space, physical space, psychological space and theoretical space - perhaps constrains us to compartmentalize our knowledge and our ways of thinking. The portals that we choose or create allow us to focus on our humanness and collaborative nature, relieving us of compartmentalized thinking. Communities of practice that form from these portals allow us to transcend time, space and disciplinary constraints to foster engagement through

hybrid pedagogical frameworks. And it is through these hybrid pedagogies that we continue to revisit our own disciplinary understandings through new lenses and ultimately strengthen the scholarship of teaching and learning.

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