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Broad Vision: the Art & Science of Looking

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Broad Vision: the Art & Science of Looking

Abstract

Undergraduate students and academic staff from diverse disciplines in the arts and sciences investigated questions of mediated vision through a year-long interdisciplinary research project at the University of Westminster, London, United Kingdom. The Broad Vision project explored the perception and interpretation of microscopic worlds, and investigated the benefits and challenges of working across disciplinary divides in a university setting. This article describes the three-phase model for interdisciplinary learning and research developed through the project, providing a valuable case study for inquiry based art/science education.

Keywords

Art, Science, STEM, STEAM, Looking, Research, Laboratory, Performance, Gallery

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Introduction

Undergraduate students and academic staff from diverse disciplines in the arts and sciences investigated questions of mediated vision through a year-long interdisciplinary research project at the University of Westminster, London, United Kingdom. The Broad Vision project explored the perception and interpretation of microscopic worlds, and investigated the benefits and challenges of working across disciplinary divides in a university setting. This article describes the three-phase model for interdisciplinary learning and research developed through the project, providing a valuable case study for inquiry based art/science education.

Outline of Learning & Research Program

Broad Vision ran through the academic year 2010-2011, bringing together forty undergraduate students and six academics in an educational collaboration. Key areas of exploration included the mechanics of vision, the perception and interpretation of scale and the influence of imaging technologies in enabling us to see beyond our natural limits of vision. The project examined how a discerning eye and visual perception are pertinent to disciplinary expertise and explored how seeing through the eyes of others can broaden ones understanding, appreciation and engagement of related subject areas. The aim was to encourage student-centered approaches to learning and teaching through consultation, collaboration and the sharing of skills within and across art and science disciplines.

Microscopy was at the core of the project, chosen for its ability to allow the visualization of subjects otherwise invisible owing to their scale and because of the inherent sense of

abstraction associated with both the resultant images and the microscopic subjects themselves. The six disciplines – Photographic Art, Life Science, Psychology, Imaging Science, Illustration and Computer Science - were chosen because of the diverse ways in which they are involved in the processes of looking, seeing and interpreting. Taking microscopy as a central form of 'looking', the questions differed depending on each subject specialism, the specimens being examined and the diversity of approaches to research.

The art & science of looking

The student researchers were at the center of all stages of project development, involved in forming the content and direction of research, and assisting in the delivery of workshops and

studio/laboratory activities. The undergraduate students who participated in the project became teachers, researchers and producers, gaining transferable skills, and building a strong sense of professionalism, in the process.

Phase One: Disciplinary Exchange

Before we could ask student researchers to engage in meaningful collaborations across disciplinary divides they needed to gain some understanding of each other's field of study. They needed to learn how the subjects of vision, perception and scale were pertinent to each discipline and to begin to appreciate the range of approaches, methodologies, languages and mind-sets within individuals and groups. Each discipline group devised a short interactive task to be shared with all the Broad Vision team – a workshop, experiment or demonstration.

These activities, whilst offering insights into disciplinary concerns and methodologies to the novice apprentices, also enabled the 'expert' students to recognize their own growing subject specialisms. By stepping back and asking themselves how they approach the subject of vision – how they see, how they use imaging technologies and how they interpret visual information – they began to appreciate their own specialist skills and knowledge, and found confidence in the realization that they could share these skills with others.

Stepping outside their own realm of expertise and 'trying out' other disciplines (artists conducting a blood test in the laboratory and observing chemical reactions; scientists engaging in a collective drawing exercise in the illustration studio and noting the diversity of interpretation) enabled students to develop and utilize 'new ways of seeing'. This process evolved into a self-perpetuating loop of observation and learning as students drew comparisons between how they and others saw and understood subjects under scrutiny, and how they approached inquiry based research.

Phase Two: Interdisciplinary Research

The following phase established smaller research groups based upon shared interests and diversity of discipline. Research questions and areas of investigation evolved from conversations (face-to-face and online), each group comprised of student researchers, supported by academic staff, from several discipline areas. The emergent themes included: the Art of Microscopy (interested in the diversity of interpretation); Eye Tracking and Aesthetics (interested in how photomicrographs are scanned by the eye); Anatomy of the Eye (exploring the internal structures and mechanisms of the eye); and Growth and Form (animating cellular behaviors).

Projects were essentially self-directed, with student researchers free to follow individual interests. The focus of the research was exploratory and open-ended initially, with outputs defined later. No single model of interdisciplinary working was stipulated – we wanted students to develop their own methods of engagement with each other – and the resulting projects took diverse approaches to art/science collaboration (some working collectively in groups, some in pairs, some working alone but influenced by dialogue and shared experimentation). Space and time allowed for unpredictable eventualities; encouraging the development of unforeseen insights that make interdisciplinary working such rich territory, where innovation and creativity can evolve.

Phase Three: Engaging Audiences

The project culminated in a number of public outputs, enabling students to engage with broader audiences. The real-world professional contexts included a touring exhibition, conference presentations and an illustrated book published by the university. The final exhibition, hosted by London Gallery West in May 2011, comprised of photographs, illustrations, animations, sculptures, collages, objects and interactive media, all work supported by statements

of intent and background information about the research conducted. Students had opportunities to discuss their work at a symposium, and at conferences, addressing questions of interdisciplinary research and learning.

The Broad Vision program continues to grow. The extra-curricula art/science project ran for a second year during 2011/12 with some student researchers returning as student facilitators, and with a new group of enthusiastic interdisciplinarians recruited from across life sciences, imaging science, visual arts and psychology. The third year, to run 2012/13, introduces a credited module to the project, which will run alongside professional development initiatives for continuing students (and some graduates).

Quotes

"*Teaching laboratories are always a great place to be, full of ideas and curious minds, yet I have never experienced the excitement of forty (well supervised) 'novices' being asked to put on a lab-coat and a pair of latex gloves for the first time. I was struck at how one's discipline transcends physical environment whereby everyone looked the same but approached tasks so differently."* Dr. Mark J P Kerrigan. Senior Lecturer, Teaching & Learning, Physiology & Anatomy

"When I first joined the research team at Broad Vision I wasn't very confident. I entered the group with an interest in science, but without great knowledge. However, after the first group session looking through microscopes, something I hadn't done for years, I saw how beautiful science really is." Mellissa Fisher. Student, BA (Hons) Illustration

"Overall, the experience was of great value to me, as teaching requires you to be confident with your specific subject area and to enable others to understand your instructions clearly." Hannah-Sian McGuinness. Student, BSc (Hons) Human and Medical Science

Heather Barnett is a visual artist, researcher and educator working with biological systems and scientific processes. With interests ranging across medicine, psychology, perception and visualization, projects have included microbial portraiture, cellular wallpapers, performing cuttlefish and self-organizing installations. She is 'Learning & Teaching Fellow' and 'Senior Lecturer' in Photographic Arts at the University of Westminster, London, United Kingdom and runs an independent arts practice working on art/science research collaborations and public art commissions. For full information on project outputs visit: www.broad-vision.info.

John R. A. Smith is a 'Senior Lecturer' in Imaging Science at the University of Westminster and an independent forensic imaging specialist. His university work includes teaching imaging science, scientific imaging and practical photography to a variety of students. He is an active member of the international forensic science community, attending and presenting at many conferences, carrying out research, lecturing at various institutions, and delivering training to students, police and private-sector forensic science providers. He describes his general interest as being "*the influence imaging technologies have in aiding our understanding of the world at every scale"*.