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The importance of cross-disciplinary collaboration in education and beyond for the future of our environment

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Over the last twenty years, a number of projects have developed from collaborations between artists, architects, landscape designers, curators, engineers, scientists and communities that involve the remediation of land that has become environmentally depleted. This has given rise to a confluence of art, technology and social engagement, and could be considered a new form of multidisciplinary practice.

My paper addresses the sub theme of “Creative collaboration across and between disciplines, institutions and frameworks”, by discussing a cross disciplinary course that I have written and teach that focuses on the Environment, and which has led to a cross disciplinary Linkage Grant to remediate former mine sites.

Art & the Environment- Studies in the Field brings together students studying fine arts, design, media arts, architecture, engineering, science and environmental humanities. The course focuses on perceptions of land and encourages cross-disciplinary interaction and creative thinking. Students respond to a range of environmental problems by physically interacting with a large area of land I have called the ‘Creative Laboratory’ at the Fowlers Gap Arid Zone Research Station north of Broken Hill, and complete the course with an exhibition in Sydney. In this paper I will show examples of the results of this course and discuss how the course represents an innovative approach to art/design education.

The ARC Grant, titled ‘Transforming derelict mine sites via collaborative partnerships: Combining community and creative practice with science and technology’ is a collaboration between Art, Science, Mining engineering, Landscape Architecture and Architecture that will develop and test a novel approach to engage communities in transformation of derelict mine sites. Due to time constraints and the relevance to the Conference Theme, this initiative will not be discussed.

My research over the past decade has led me to believe that we now live in a world that presents problems or challenges that transcend any singular discipline. Many academics have realised that we now need to educate from both a disciplinary and interdisciplinary manner in order to address some of the complex problems we now face. According to Associate Professor Mark Diesendorf from the UNSW Institute of Environmental Studies:

Most of the academic research at Australian universities is disciplinary based, while the biggest problems faced by human society fall into the broad categories of environmental destruction, resource depletion, poverty, war, disease, injustice, inequity and exploitation, none of which fits into a single academic discipline. These are inherently complex, 'wicked' problems that not only require inputs from several disciplines, but also require new forms of knowledge and research that have not been classified as disciplines. (Diesendorf and Rammelt, 2012)

He goes on to say that he accepts that individual disciplines do contribute to the understanding of these 'wicked' problems but sometimes these problems can be inadvertently misrepresented or even trivialized by traditional disciplines. I might add that traditional disciplines may have a tendency of thinking in a linear fashion when it comes to some of these problems, thus not enabling a more lateral, or new approach in the search for solutions. Diesendorf believes that interdisciplinary research can be more effective, because the focus is on the problem and its solutions, instead of the individual disciplinary perspectives and solutions.

This is not a unique position. At the Centre for Study of Higher Education, University of Melbourne Clinton Golding has written that certain complex problems and phenomena are difficult to understand through the lens of one discipline alone. He includes Climate Change and World Poverty as examples, amongst others. He sites Howard Gardner when he calls for a 'synthesising mind' in order to begin to understand and solve some of these contemporary global problems. (Golding, 2009)

In 2006 I was invited, along with other Australian artists, to participate in the Zangsporen Project in Holland (Figure 1). Artists were asked to brainstorm with architects, town planners, farmers and scientists on issues pertaining to an area of land called the 'Green Heart'. Thinking we had been invited to make art works in Holland we were surprised when informed that the organisers were interested in our

ideas on how to manage an area of land. This was the first time I had ever been asked as an artist to contribute ideas to important decisions on land management.

As a result, my colleagues and I decided to reciprocate the invitation and in 2007 invited a group of Dutch artists, architects and designers to attend a conference we held at the Fowlers Gap Research Station called *Re-Cognising the Land – To See Anew* (Figure 2). This conference brought together artists, designers, architects, scientists, writers and indigenous elders from Australia and Holland to explore the issue of sustainability in the arid zone and how cultural perceptions of the land contribute to present land use.



Figure 1. The Zangsporen Project – Holland

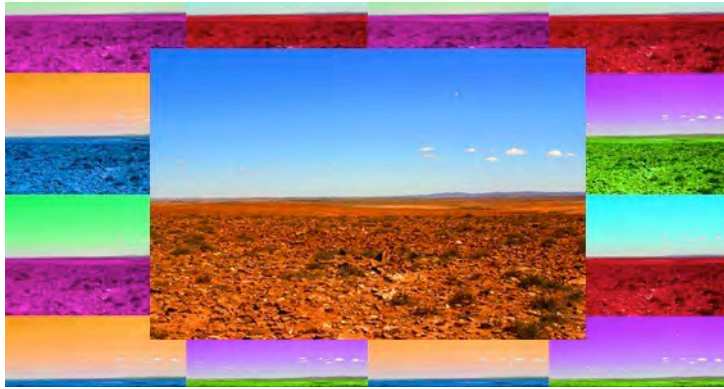


Figure 2. Re-Cognising the Land – To See Anew Symposium.

As a result of these experiences I began to explore the new environmental art movement that was starting to come to prominence internationally. It was also at this time that I wrote the course *Art and the Environment – Studies in the Field*. This course introduces students to the Environmental Art movement and uses the definition for Environmental Art sourced from the Green Museum, as follows:

What is Environmental Art?

In a general sense, Environmental Art is art that helps improve our relationship with the natural world. Much environmental art is ephemeral (made to disappear or transform), designed for a particular place (and can't be moved) or involves collaborations between artists and others, such as scientists, educators or community groups (distributed ownership).

Some environmental art:

Informs and interprets nature and its processes, or educates us about environmental problems.

Is concerned with environmental forces and materials, creating artworks affected or powered by wind, water, lightning, even earthquakes.

Re-envision our relationship to nature, proposing new ways for us to co-exist with our environment.

Reclaims and remediates damaged environments, restoring ecosystems in artistic and often aesthetic ways. (The Green Museum 2010)

As stated in the Course Outline, the aim of the Art & the Environment Elective is to: -

1. Focus on the importance of perception to our cognition and ultimate treatment of the land.
2. Enable students to explore and gain further understanding of arid zone

landscapes through the investigation of the environment of far western NSW, both the post-mining town of Broken Hill and the research facility at Fowler's Gap, with a direct emphasis on their application to real world situations in the fields of fine arts, design, media arts, architecture, engineering, environmental humanities, environmental management and science.

3. Achieve multi-disciplinarity through integrated teamwork, with participants from a variety of disciplines across the University.

Students are drawn from the under graduate and postgraduate cohort of each Faculty, with a preference for students undertaking third or fourth year of their studies. They are assessed on an individual project and on their contribution to a group project and are required to write a proposal for their individual project, which they discuss with the Lecturer and then exhibit the outcome in the exhibition in Sydney. There is no requirement to produce an artwork in the traditional sense, but rather to think about the problem in a more lateral or even novel way, then respond by creating something that expresses the idea physically, and can be exhibited.

For the group project, small teams are created with each student ideally coming from a different discipline. These teams work together to create an installation on the Creative Laboratory at Fowlers Gap, which is videoed and photographed for inclusion in the exhibition in Sydney. A mark is given to each team project, and then students undergo peer assessment in order to ensure each student is rewarded fairly.

The first week of this intensive course is spent in Broken Hill. Students are exposed to a variety of perceptions of this land. They go down a mine and learn about conditions for miners early last century (Figure 3). They learn about permaculture and vermiculture where they discover how worms can rehabilitate contaminated land and the transformative nature of the soil produced for local farmers (Figure 4). They experience the indigenous perception of the land by spending the day at Mutawintji National Park with elder and respected artist, Badger Bates (Figure 5). They learn about water issues (Figure 6), and they are introduced to some initiatives that have been undertaken on contaminated land.



Figure 3. Students exiting Daydream Mine, north of Broken Hill, 2013



Figure 4. Visit to Australian Vermiculture farm



Figure 5. Badger Bates speaking about the rock art of Mutawintji

One example of an initiative of interest is the olive grove plantation on contaminated land in Broken Hill. An initiative led by an artist in collaboration with a local doctor, the team planted olive trees on lead contaminated land at the base of the 'line of load' in Broken Hill. As a result of this experiment the team discovered that, although the fruit was contaminated with lead, the olive oil showed no trace of lead. Interestingly they have gone on to win international awards for their Olive Oil. Figure 7 shows members of the *Re-Cognising the Land – To See Anew* Symposium speaking with one of the people who initiated this project at the Olive grove plantation in Broken Hill.



Figure 6. Menindee Lakes



Figure 7. Olive Grove on Lead Contaminated Land, Broken Hill

After a week in Broken Hill and Mutawintji National Park students are taken to the Fowlers Gap Research Station, 110kms north of Broken Hill, where they spend the next eight days working on their projects.

Students are placed into multi-disciplinary groups, with each team focusing on one of the projects that have been suggested to the class. These group projects include: -

- The Land is my Canvas.
- Sustainable Sculpture/Structure/Shelter.
- Adventure Playground/Energy.
- Open Proposal.

The following images show examples of Group Projects that have been constructed on the Creative Laboratory land by Art and Environment students.

Examples of 'The Land is my Canvas' Group Project

This project is most directly related to Land Art, but stresses the added value of transforming perceptions of this land (where so many local people prefer the 'European garden') at the same time as having utilitarian purposes.



Figure 8. The Phases of the Moon, 2012



Figure 9. Land Art that filters water, 2013



Figure 10. Land Art that filters water, 2013



Figure 11. Water well, 2013

Examples of Sustainable Sculpture/Structure/Shelter Group Project

Students were introduced to the Earth Ship movement that has gained international recognition as well as other initiatives that explore building from recycled materials, including an initiative of mine that has produced a feasibility report on building with water retaining walls. The group was taught how to build a traditional indigenous Wilpi in July 2010 (shown in bottom right image of figure 12). A team of students who undertook the Sustainable Sculpture/Structure/Shelter project in 2012 built a recycled version from materials gathered at the tip, then created a performance that imagined alternative communities of the future, which they videoed and exhibited in Sydney (left image of Figure 12). As a result of learning about the construction of a Wilpi, which was still standing 3 years later, an architecture student produced a 'flat- pack Wilpi' for her individual project (Figure 13). In 2013 a group of students produced a portable shelter that collects water at night and can be carried on your back when conducting field studies in the arid zone (Figure 14).



Figure 12. Traditional and alternative Wilpi, 2012

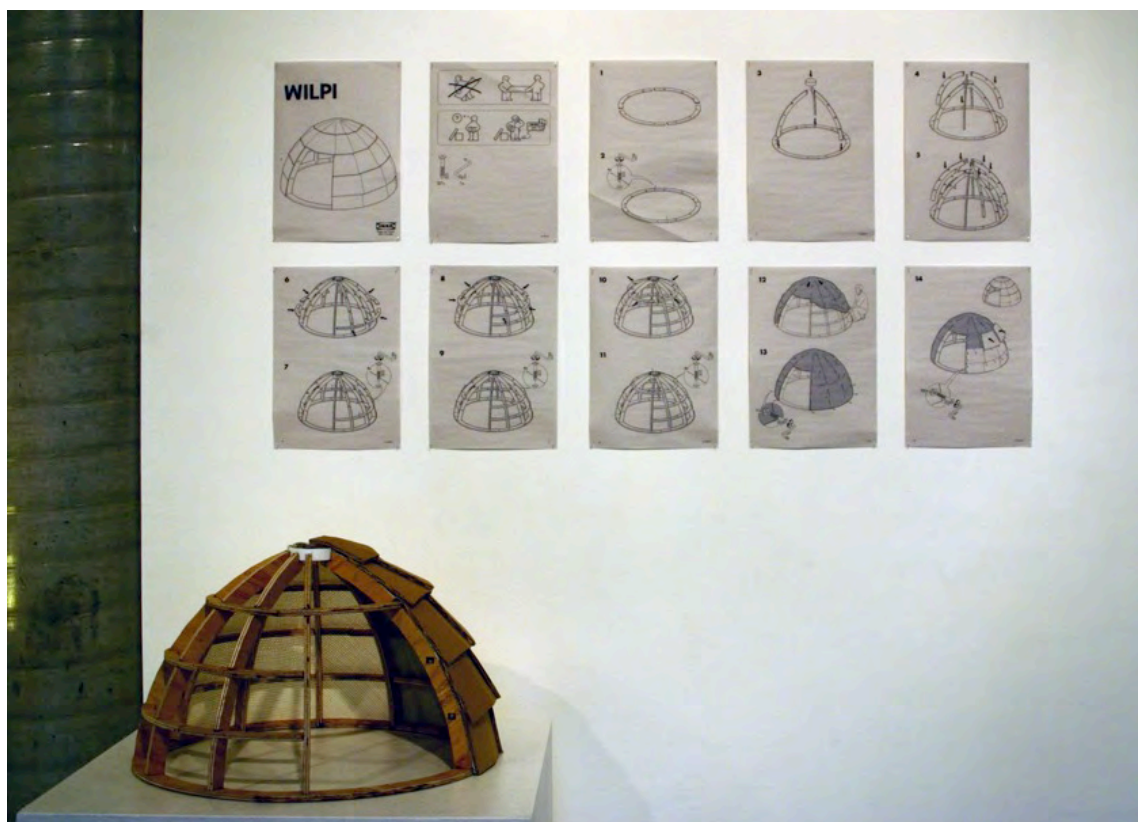


Figure 13. Flat pack Wilpi produced by architecture student for her individual project, 2011



Figure 14. Shelter that collects water at night and can be carried on your back, 2013

Examples of Adventure Playground Group Project

The aim of the Adventure Playground is to create an educational space that incorporates play, at the same time as focusing on sustainability and exploring the particular environment it is found in. Students were introduced to the Adventure Playground movement in Japan along with other examples around the world. For the example shown in Figure 16 students researched the local plants, then isolated them creatively and carved the relevant information on sticks placed in each installation. We were pleasantly surprised by how the local children at Fowlers Gap engaged with these Adventure Playgrounds, and have some wonderful footage of students and local children playing on the flying fox in 2013, which was created out of found materials on the land, combined with an old pram that had been sourced at the Broken Hill tip. This installation also included a small merry-go-round, which, when operated created energy that turned on a light on the top of the tripod construction.



Figure 15. Adventure Playground, 2011



Figure 16. Adventure Playground, to teach about the local plants. 2011



Figure 17. Flying Fox constructed from local materials and recycled objects found in the tip

Examples of 'Open Proposal' Group Projects

Students can put forward an idea for a project that has not been prescribed, as long as it fits into the aims of the course. In 2012 a group of students constructed a vertical green wall with a blind that was able to open and close, made from recycled pipe sourced from the Broken Hill Tip (Figure 18). All students show their group and individual projects in an exhibition organized in Sydney each year. Figure 19 represents the exhibited work for the group who created the recycled blind.



Figure 18. Vertical green wall with close able blind made from recycled pipe



Figure 19. Concept of blind from waste pipe exhibited in Sydney

Over the past three years there have been numerous innovative projects produced on the Creative Laboratory as a result of this course. These include a caravan that was transformed into a camera obscura by turning it into a darkened space and cutting out a small hole which held a lens (Figure 20), a sun dial produced from an old satellite dish and other paraphernalia from the Broken Hill tip (Figure 21), a chair produced from locally found junk and many innovations that have transformed the arid zone of Fowlers Gap into beautiful 'garden' spaces.



Figure 20. Photographs taken with the 'Caravan' Camera Obscura, printed onto material. Images are upside down and back to front, to represent how the camera obscura projects them.



Figure 21. Sun dial, in the 'field' and exhibited in Sydney. 2011

In 2012 respected Environmental Philosopher, Professor James Hatley from Salisbury University in the USA participated with this course as a Faculty participant. His response to the experience, which he put into a letter to me after returning to the states, was as follows:

This course was a unique opportunity for research and learning that I can recommend enthusiastically to other scholars and students in a wide variety of fields stretching from the arts to the humanities to the social, natural and applied sciences. It was eye-opening to find students respectively in art, environmental studies, architecture, engineering and geology actively collaborating on their group projects; diverse works of earth/land art to be installed on the Creative Laboratory during the ten day residency at Fowlers Gap Station. One evening I overheard students in geology, engineering, architecture and art doing research on and working out the exact geometry of the phases of the moon in order to craft their installation. One could hear how the focus of each student's particular field of endeavour supplemented the others as they moved to a consensus and drew up plans for what became a striking work.

He goes on to say:

As a scholar and educator in the environmental humanities, I am deeply impressed by what you have done in order to bring a truly inter-disciplinary community of learning into being in the world lying outside the university classroom. By bringing the students into personal contact with community activists in the arts, with community entrepreneurs involved in olive oil production and in vermiculture, with spokespeople for the Aboriginal peoples of the area, with historians of the Darling River, with local miners and yet others, the course prepares the student to become not only a creative but also a knowing respondent, an artist who takes seriously the reality of human communities and the complexity of their relationship with the earth by which those communities are nurtured and sustained. (Hatley, 2012)

The Course was described as 'ground breaking' by environmental artist Janet Laurence when she opened the 2012 exhibition in Sydney, and the feedback from students over the years has always been unbelievably positive. Many students have provided written feedback, too numerous to include here – so I have chosen two comments, which I copy below.

This course IS my favorite of my entire career studying Architecture at UNSW. I learned valuable lessons about the realities of transforming line-work (design) into built form, and learnt about the true nature of the built environment outside our cities. (Master of Architecture student)

The Art and Environment Course really was the most inspiring course I've done in my degree and has influenced my design practice enormously. It has opened my eyes to the importance of promoting environmental awareness within a community, even one as small as Broken Hill. Alongside the course itself, I found the chance to interact and work so closely with students from other disciplines incredibly rewarding, and what's better is that we've maintained contact since returning! These are students who I know I will be able to count on in the future, especially for environmental based projects. Overall the course has made me far more aware of the negative environmental impacts we are having on both urban and distant arid regions of Australia. The ability to work with such inspiring people and in such an extremely different environment has really been invaluable to my education

and is something I will be sure to recommend to fellow students for future years! (Bachelor of Design student)

Unfortunately there is not enough time at this conference to speak about all of the interdisciplinary projects that have been produced, so I would like to simply show some images from some of the Art and Environment exhibitions that have been held in the University Gallery in Sydney, showing the diversity of responses.

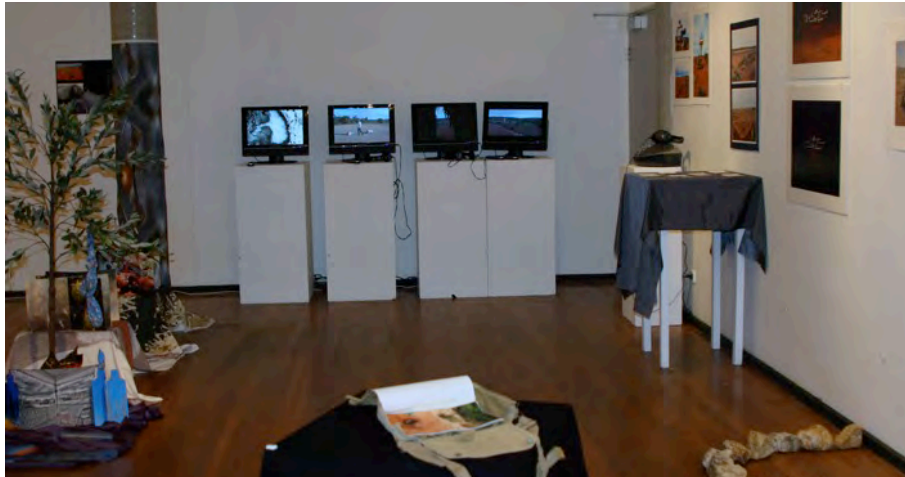


Figure 22. 2011 Exhibition – room shot



Figure 23. Environmental artist, Janet Laurence opening exhibition, 2012



Figure 24. 2012 Exhibition Opening



Figure 25. 2012 Exhibition Opening with students serving food sourced from 'Dumpster Diving'

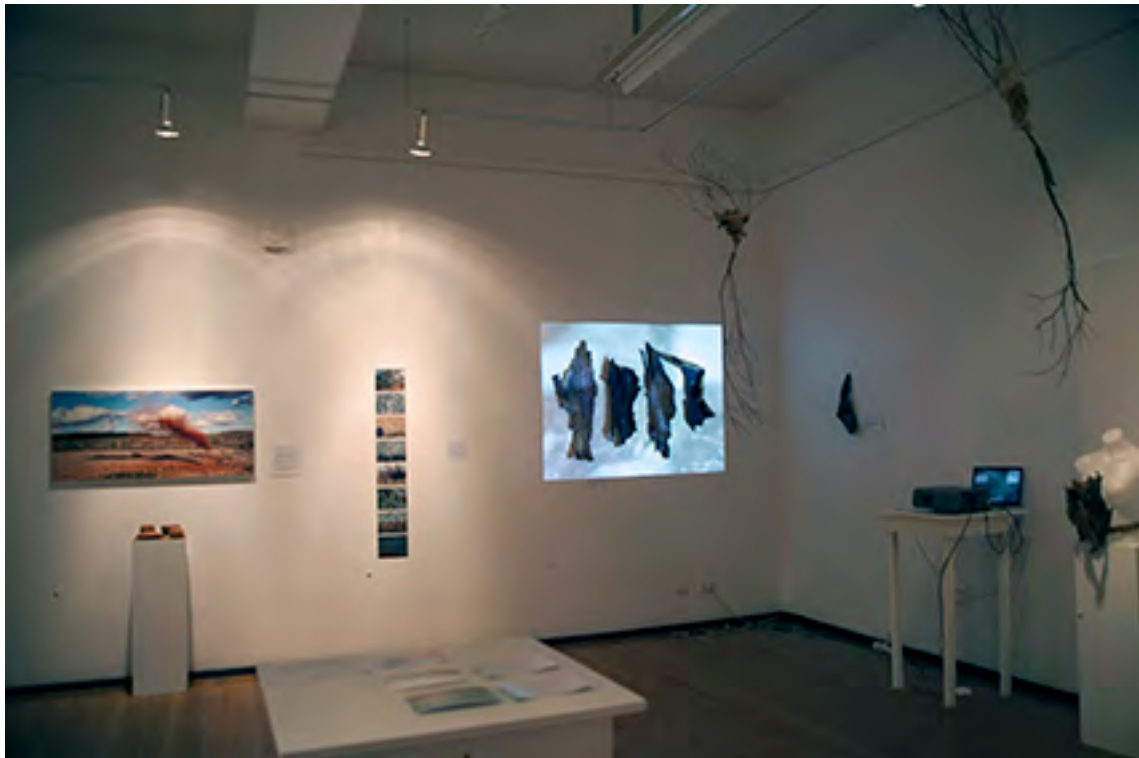


Figure 26. 2013 Exhibition – room shot

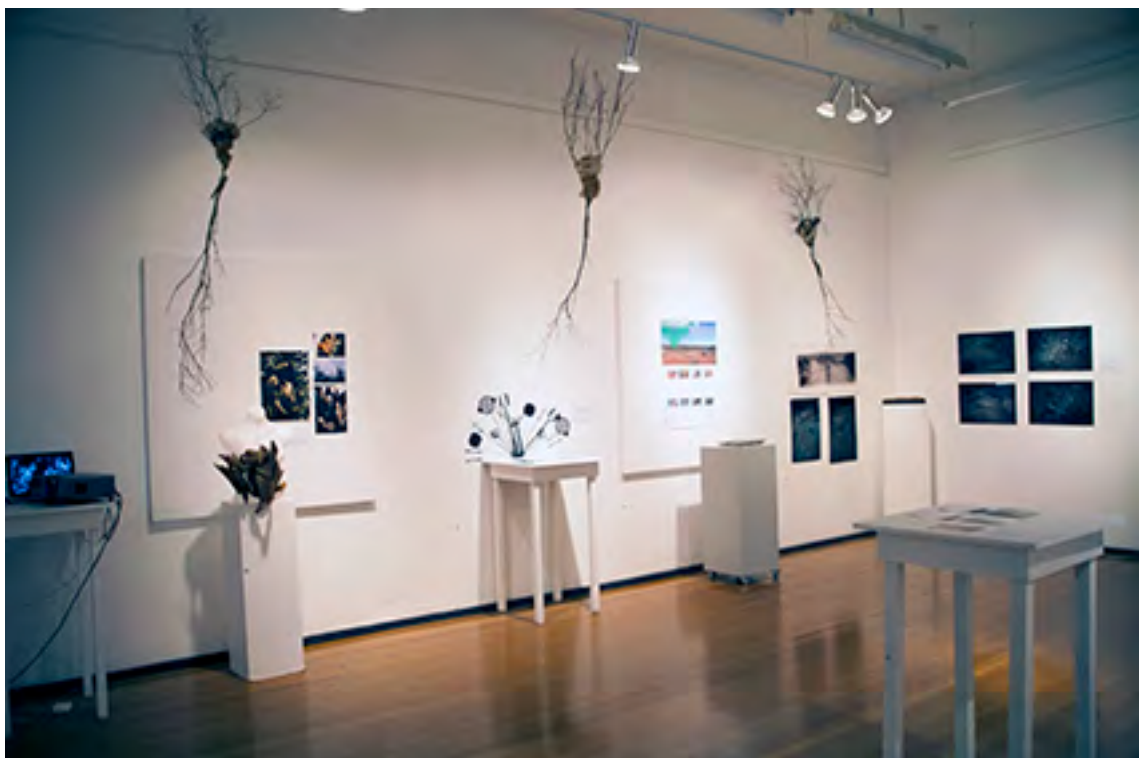


Figure 27. 2013 Exhibition – room shot



Figure 28. 2013 Exhibition – room shot

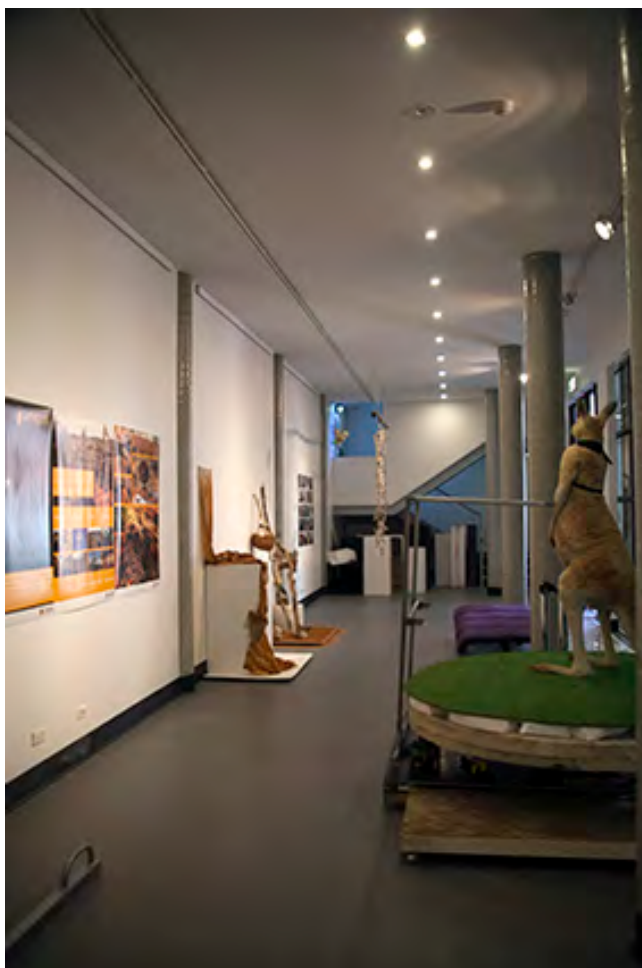


Figure 29. 2013 Exhibition – room shot

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