Urban stream rehabilitation: Enabling school children and community to 'visualise' a cleaner and healthier urban stream using art, science and the power of imagination

Robba L[1], Wright I[1], Allen J[1], Capon A[2]

1 Western Sydney University, Locked Bag 1797, Penrith NSW, 2751.

2 Monash Sustainable Development Institute, Monash University, Clayton Campus, VIC 3800

Email: Leo Robba: L.Robba@westernsydney.edu.au Ian Wright: i.wright@westernsydney.edu.au Jonathon Allen: j.allen@westernsydney.edu.au Anthony Capon: tony.capon@monash.edu

Key Points

- Using art, science and social design to enable community environmental awareness
- Support creative thinking and practice-based learning to connect with the natural world
- Value and communicate the importance of place and change through science and visual storytelling
- Build eco-literacy, adaptability, resilience and a sense of hope among young people

Abstract

This paper discusses the *Painted River Project (PRP)* – a collaborative science and art workshop held with a year 6 class at Forest Lodge Public School, Sydney as part of National Science Week in August 2020.It introduces the concept of Planetary Health and how the *PRP* fits into this wider agenda, outlines the preparation, activities and resultant student work conducted as part of the *PRP* field study workshop, before going on to report on some of the educational, social and community outcomes. The *PRP* is a model of transdisciplinary action research and engagement that seeks to communicate the nexus between nature, culture and society through the practices of art, science and design.

Keywords

Art, science, water ecology, education, engagement, community, culture

Introduction

> *Painting is a science and should be pursued as an inquiry into the laws of nature. Why, then, may not landscape painting be considered as a branch of natural philosophy, of which pictures are but the experiments?*
>
> *John Constable* (quoted in Thornes, 1999, p51)

In September 2019 we witnessed the Climate Strike that saw hundreds of thousands of Australians rally across the country (ABC, 2019). In March of that year, an estimated 1.6 million school-aged protestors in 125 countries rallied to demand action be taken to combat climate change (Wu et al. 2020). These protests were part of a global movement empowered by social media and ignited in large part by the youth of the world led by climate activists Greta Thunberg and Isra Hirsi. The protesting students expressed their despondency at the on-going inaction of the world's political leaders, older generations and the institutional strangle hold of vested interest groups such as the fossil fuel industry. Their message was explicit – we are running out of time and we need to act on what science is telling us.

It is now clearly understood that "climate change poses a major threat to human health" (Wu et al. 2020) and whilst, to date, there is no sound data to measure increases in stress-related problems, there are growing concerns around the indications that young people are adversely affected by *eco-anxiety* (Wu et al. 2020). Currently the most widely accepted definition of eco-anxiety has been provided by social psychologists in a major report (American Psychological Association (APA) and Eco America) as 'a chronic fear of environmental doom' (quoted in Pihkala, 2020). Eco-anxiety is described by Panu Pihkala (2020) as a rapidly growing phenomenon, and whilst people should be rightly concerned about the scale of the environmental challenges we are facing, it is also crucial to have an awareness of the practical implications and, as a society, work collectively to build a sense of hope for the future. As educators there is an imperative to emphasise the value of adaptability and resilience, and to be equally aware of the pressures and stress – and the associated emotions such as grief, guilt, anger, and despair – that many children feel from the constant and unabating negative messaging about the environment.

Given the recent prolonged period of drought followed by the catastrophic bush fires, young people are rightly concerned about their collective futures and understand what the science is telling them – we have reached a crucial point in human history and it's time for us to not only re-think the way we live but to fundamentally reassess what we value and how we care for the natural world upon which we all depend. When speaking at a Brisbane rally, teen activist Toby Thorpe stated, "Activism is education and this is our classroom – we're not the students here, we are the teachers, and we will not stop until we're heard" (ABC, 2019). As communities, it is particularly important to empower young people to address complex and often seemingly intractable problems like the climate crisis. Our schools, universities and institutions have a generational responsibility to be future-focused and to imbue students and young people with a sense of collective accountability, eco-literacy and to support them to be adaptable and resilient in a changing world.

The Painted River Project and its aims and objectives

As educational outreach in response to the COVID pandemic, and as part of 2020's National Science Week's *Caring for Oceans,* artist and academic Dr. Leo Robba and scientist Dr. Ian Wright ran a day-long outdoor art and science class with 40 year 6 students from Forest Lodge Public School in inner Sydney. The students examined, through artmaking (painting) and water science, *Sydney Water's* Johnstons Creek naturalisation project in Annandale which was under construction. The naturalisation of this degraded waterway is part of a broader strategy by Sydney Water to improve the liveability and water health of its urban watersheds by providing native habitat and (stormwater) wetlands in crucial parts of the system. This was one part of a larger program of research, teaching and engagement by Robba and Wright which is known as the *Painted River Project* (*PRP*), and this was the fourth iteration of the project.

After contacting the school and assessing interest, we established an action plan in conjunction with the school's Principal, Stephen Reed, and some engaged parents. Prior to the event, we held online briefings with students and teachers to give them an understanding of what to expect and participated in a lively question and answer session about what the natural world meant to them, along with their freely-given concerns for the environment. We explained the *PRP's* multi-disciplinary approach and the project's agenda, framework and methodologies – in order to build eco-literacy, directly support creative thinking and practice-based participation which links the natural world, art and science with a sense of wonder to fuel their imaginations.

The initial briefings included a short introduction to Planetary Health, explaining that the PRP's core conceptual framework is underpinned by Planetary Health principles defined in *The Lancet* as "a new

science for exceptional action" (Horton & Lo, 2015) which encompasses "the health of human civilisation and the state of the natural systems on which it depends" (Whitmee et al., 2016). Planetary Health's guiding principle is to safeguard the health and wellbeing of current and future generations through good stewardship of the Earth's natural systems. We also explained that it links 'the things we do' with the 'health of people' and the 'health of the planet' and is further defined by how we manage ourselves to be inclusive and to leave no one behind.

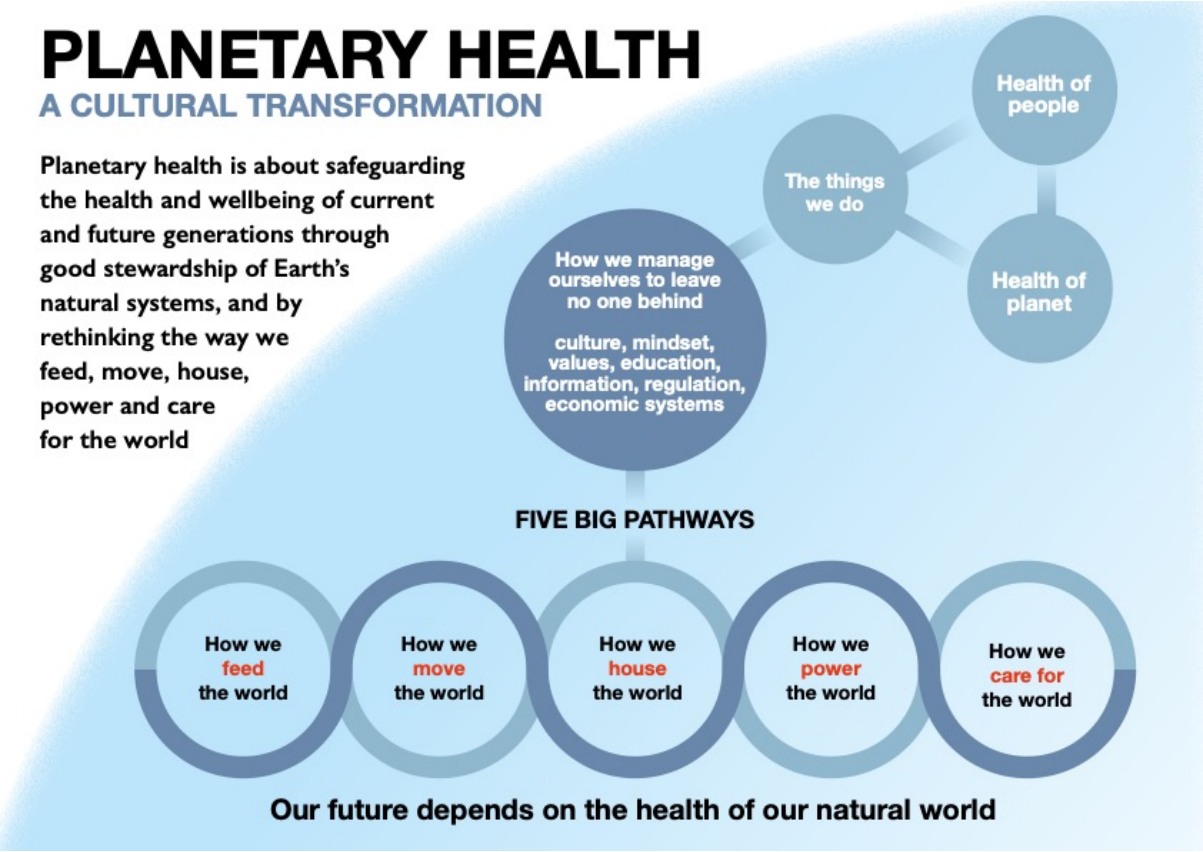

Figure 1. Draws a direct connection between human activity (the things we do) with the health of natural world (our planet) and human health. As a framework, it seeks to illustrate a common language and a shared need for a change in people's perspective through a shift in values, intentions and behaviours and by linking each person's own health to the health of the planet. (Capon & Robba, 2017)

From the outset we explained the vital connection between art, knowledge, and our role as part of a collective effort to understand, value and communicate the importance of place and change through science and visual storytelling. We also expressed the *PRP's* aim to empower young people as rightful participants in a much larger community conversation, and to give voice to their concerns for the environment. Further, through the resultant artworks and our media connections, we sought to promote and communicate their distinct visions of their unique place – a place at the heart of community.

Prior to the outdoor art and science class, the students were briefed about what we hoped to achieve from the day and the key elements that make up the *PRP*. One of those being the importance of image-making in communicating science, and the shareability and dissemination of images as knowledge. This discussion was then linked to their understanding, and in some cases

participation, in the recent climate strikes, and an active question and answer session about their aspirations for the planet, their family and their community. Next, as part of the briefing we introduced the idea of storytelling and the power of pictures to tell stories. Then a link was drawn between art and storytelling and their ability to create culture, followed by a short description of how we live, the need for change, and the premise underpinning the *PRP* – that if we are to change the culture of the way we live, it is important to support people to create new stories to imagine and visualise their future. This concept was reinforced by linking art, science and how we care for the world and the health of people – in essence, the principles of planetary health (see figure 1.) By this simple explanation of planetary health, and the idea that all living beings are an intrinsic part of nature, we reinforced the idea of collective responsibility with the realisation that we must come together to work within the boundaries of nature in sustainable ways.

The *Painted River Project* in action

The painting session with the students was run as a workshop / *Field Studies* model with a particular focus on a creative response and 'interpretation' of what was seen. This particular *'Field Studies'* model was developed by John Reid at the ANU, School of Art and Design which he described as, "facilitating student artist contact in field locations with scientists and community informants, to inspire the production of visual aesthetic imagery in response to prevailing environmental issues". (Reid et al., 2015, p38). A key part of the *Field Studies* methodology is opening up participants' sensory perception by engaging with the physical realm and how that might be translated symbolically or metaphorically through visual expression.

On the day, we provided paint, brushes, palettes, easels and canvases. We then asked students to carefully 'observe' the creek naturalisation and to paint their vision of a cleaner more natural creek and ecosystem – one they would like to see. An initial practical painting demonstration along with a discussion of composition and use of materials was provided to get them started and to encourage, guide and dispel any 'fears' they may have had. Care was taken to emphasise the need for non-judgement, open-heartedness and collective engagement with the process rather than attributing success to the final visual outcome.

Figure 2. Science and artmaking at Johnstons Creek naturalisation project in Annandale.

For the science component, in small groups, the students were shown creek animals collected from a clean creek, discussed what was once abundant in the creek, and what would be there now. This opened a lively discussion and built on the knowledge students gained from studying the local history and the significant changes made to the area since colonisation. In small groups they were asked to spend time observing and mapping what they saw through observational drawing. This work was then discussed with their teachers and formed part of a school project at a later date.

Urban development of a landscape has a well-known impact on water quality and ecological health of waterways draining urban areas (Davies et al. 2010). This causes a cascade of physical, chemical and biological changes that can degrade stream habitat quality, cause pollution of water and contribute to the loss of sensitive aquatic species. This is a world-wide phenomenon and has become known as the 'urban stream syndrome' (Paul & Meyer, 2001). The students discussed the highly degraded channel of one of Sydney's most urban creeks 'Johnstons Creek' (Figure 3a) and also viewed the sections that were being rehabilitated as part of creek naturalisation works (Figure 3b). On the edge of Johnstons Creek the students examined invertebrates collected from a clean non-urban creek in northern Sydney. The animals that the students examined included groups that are generally intolerant to pollution, such as mayflies, stoneflies and caddisflies.

Figure 3. Left. Unrehabilitated Johnstons Creek (a) and right Johnstons Creek (b) undergoing naturalisation works at Annandale.

As the activities unfolded, the school's teaching staff were impressed by the students' focus, and the class' ability to deftly integrate both disciplines and practices of science and art. The students started to notice what they had previously taken for granted or had simply overlooked – for them, this quite familiar place was now seen in a different way. Through observation of both the micro and macro aspects of place the detail and complexity of their surroundings were revealed. The act of noticing in a different, more holistic, way allowed the students to make a seamless connection between the ecology and culture of place and, importantly, it situated them in their place in the natural world.

Figure 4. A small selection of the students' artworks produced on the day.

The more than 40 artworks produced by the students were photographed, and then an exhibition of the artworks was displayed at the School and became a central part of the discussion for their science projects. The School Principal, Stephen Reed, summarised the entire experience well:

> *As a project it really brought to life the STEAM principles that we integrate into our teaching and learning programs. The engagement of our students from the first minute was incredible. The project provided an opportunity to provide real life examples of how science, engineering and arts fit together as one. From this, our students naturally became more inquisitive, started asking deeper questions and were able to show incredible creativity throughout. Due to the nature of the project, it was open and free to interpretation that engaged all students. However, throughout the workshops, appropriate scaffolds were in place to support and guide our students which provided the perfect canvas for students to show their knowledge and understanding.*

On the day of the *PRP* event a photojournalist from the Sydney Morning Herald attended to document the students' participation and to photograph the science and art outcomes that they had made (see Dye, 2020). The subsequent media exposure gained the attention of the broader community and through the efforts of Frier Bentley, a committed parent at the school, we were offered a building by Sydney City Council at Johnstons Creek to use to create a mural in celebration of the students' work. As a result of the collective goodwill that was built by the project, we were provided funding to produce the mural by Sydney City Council, Sydney Water and Diona, the infrastructure company responsible for the Johnstons Creek Naturalisation project. Visual Communication Design students at Western Sydney University were then tasked with taking the artworks of the school students to use as inspiration for the design of the mural. In collaborative consultation with the school community a co-designed piece was finalised and a mural artist was then hired to work with the children to paint the 12metre by 2metre mural.

Figure 5. The finished mural with the school principal, local politicians, students and the project team. (Photo: Sally Tsoutas, WSU)

Reconnecting with nature through knowledge and shared creative experiences

As a society we have developed a culture of increasing separation from nature. One great way to reconnect is to create meaningful education programs that provide more opportunities for our imaginations to resee nature – innovative environmental education programs which link shared creative experiences with knowledge that shape interactions and new relationships with the natural world. To forge this new relationship, we need to enable collaboration and a genuine sense of shared purpose – one that re-values nature and science by, what Stephen Boyden identified as of immense ecological importance: "the nexus between nature and culture and the influence human behaviour has on living systems." (Boyden, 2004).

Art and design both express and create culture, and by joining these disciplines with scientific inquiry and knowledge we can help to progress new levels of understanding and better ways to communicate to reshape the prevailing culture. In *The Biology of Civilisation*, Boyden highlights the unheeded paradox "while the main threats to humankind today are the consequences of the human aptitude for culture, our only hope for overcoming them lies in in this aptitude." (Boyden, 2004). Art and visual storytelling are embedded in our understanding of history and human culture. Pictures and artefacts help chronicle issues, customs and cultural traces from our past and, crucially, help us make sense of the world. Art's ability to translate human experiences across space and time, and to form part of society's collective memory, is fundamental to human health and wellbeing. Art allows us to picture the world in tangible ways so we can reflect and reimagine who we are and to envisage solutions to the complex challenges we face.

Many of us – young people included – are so caught up in the current fragmented system of living that it is hard to find time to slow down, to look, to feel, to rethink and find meaningful ways to act. If we are to change our relationship to the natural world and our current exploitative behaviour, we must enact a culture of planetary health in order to picture new perspectives, visualise new stories and offer our young people messages of hope for their future.

Acknowledgements

Thank you to the students and staff at Forest Lodge Public School; Frier Bentley; Sally Tsoutas; WSU Design students Dakota Hudson & Susan Alziam; Sydney Water; Cr Linda Scott; City of Sydney; Diona

References

ABC (2019). Global climate strike sees 'hundreds of thousands' of Australians rally across the country. *ABC News.*https://www.abc.net.au/news/2019-09-20/school-strike-for-climate-draws-thousands-to-australian-rallies/11531612 (accessed 13 January 2021)

Boyden, S. (2004). *The biology of civilisation*. Sydney: University of New South Wales Press

Dye, J. (2020). Inner west creek given new life on canvas. Sydney Morning Herald. https://www.smh.com.au/culture/art-and-design/inner-west-creek-given-new-life-on-canvas-20200819-p55n2e.html (accessed 30 April 2021)

Horton, R. & Lo, S. (2015). Planetary Health: a new science for exceptional action. *The Lancet*. (https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)61038-8/fulltext) (accessed 13 January 2021)Pihkala, P. (2020). Eco-Anxiety and Environmental Education. *Sustainability.* Vol. 12, No. 23

Reid, J., Capon, A. G., & Dixon, J. (2015). Much Said, Much to be Done: A Field Study Collaboration between Scientists and Visual Artists about Contested Landscapes in Western Sydney. In *Health of People, Place and Planet*, ANU Press. p. 38.

Sydney Water (2020). *Johnstons Creek naturalisation.* https://www.sydneywatertalk.com.au/johnstonscreek?page=1 (accessed 13 January 2021)

Thornes, J.E. (1999). *John Constable's Skies: A Fusion of Art and Science*, Bloomsbury

Whitmee, S., Haines, A., Beyrer C., Boltz, F., Capon, A., et al. (2015). Safeguarding Human Health in the Anthropocene Epoch: report of The Rockefeller Foundation-Lancet Commission on planetary health. *The Lancet*. (https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)60901-1/fulltext#%20) (accessed 13 January 2021)

Wu, J., Snell, G., & Samji, H. (2020). Climate anxiety in young people: a call to action. *The Lancet Planetary Health.* https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(20)30223-0/fulltext#back-bib3 (accessed 13 January 2021)