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The Engagement Tree: Arts-based Pedagogies for Environmental Learning

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Abstract

This case study reports on an arts-based project called "Tree-Mappa," one that sought to engage primary-school children in learning about their local environment through significant trees. Pedagogical approaches featured the use of arts-based strategies as the means for activating cognitive and affective responses and learning. The frame for analysis was that of student engagement and learning, recognising that for students to be mobilised to care about and act for the environment requires both knowledge but also emotional commitment and the means for expression and communication. Findings drawn from student reflective responses and focus group interviews identified various triggers for student engagement. These included excursions and outdoor activities framed by arts-based processes. The study signals the value of ongoing research and practice to verify the potential of different arts-based strategies for engagement, commitment, and meaningful learning about the environment.

Introduction

Arts educators around the globe are increasingly concerned with playing their part in helping their students grapple with big issues of our times related to climate change and environmental destruction. For those educators who work with young children in early childhood and primary schooling contexts, rather than focus on messages of gloom and destruction, the ways to engage them may more appropriately lie through cultivating knowledge and appreciation of the environment through the arts. Therefore, it is important to identify those strategies that may contribute to productive student engagement with the environment. This research project sought to investigate the nature of student engagement when primary school teachers used arts-based strategies with the intention of building children's knowledge of the environment and sustainability. The nature of the learning and triggers for engagement were analysed as related to one school-based project, entitled "Tree-Mappa." The focus for activity was on something to be found in most school environments, the "tree." The approach used connected school involvement to a regional project that aimed to celebrate significant local trees. These trees could be significant because of their endemic nature, their role in an ecosystem, historically or culturally. Local knowledge and issues were to be used to inform art-making and storytelling and acted as the stepping-stones for raising awareness about wider environment and sustainability issues. This article outlines relevant contextual literature, project features and research methodology before identifying key triggers and pathways for engagement and learning.

Contextual Literature

A conceptual focus for this study was on student engagement and learning. This highlights the importance of emotional connections and enactive responses for both productive learning experiences and environmental awareness. The experience of interest and engagement is not necessarily a guarantee for learning; however, the recognition of triggers and features of student engagement may increase the possibilities for student learning, emotional connection and attitudinal change. Several frameworks for understanding engagement were interrogated upon for this study. A definition referred to initially drew from Akey's description of school engagement (one which is often quoted in the engagement literature) with engagement described as:

> ... the level of participation and intrinsic interest that a student shows in school. Engagement in schoolwork involves both behaviours (such as persistence, effort, attention) and attitudes (such as motivation, positive learning values, enthusiasm, interest, pride in success). Thus, engaged students seek out activities, inside and outside the classroom, that lead to success or learning. They also display curiosity,

> a desire to know more, and positive emotional responses to learning and school. (Akey 2006, p.6)

What may be seen as underpinning such a definition however, is a notion of student engagement as almost being synonymous with motivation with little acknowledgement of the role of the environment and "activities" as activators of engagement. The definition does acknowledge the experience of engagement as embracing physical and affective components and this is also reflected in a major body of engagement research which has occurred in Australia. One body of work has been predominantly qualitative, using case study and mixed method approaches to explore school climate and pedagogical strategies (Munns 2007; Munns *et al.* 2006; Munns and Woodward 2006; Munns *et al.* 2008) and resulted in the development of research-based engagement frameworks. These frameworks recognize that engagement may be stimulated in high operative (physical/doing), high cognitive (thinking) and high affective (emotions and feelings) learning environments, with these three dimensions being drawn from the work of Fredricks, Blumenfeld and Paris (2004). The combination of these three domains is seen as important for overall engagement and learning to occur at classroom and school level. There is little specific research that analyses the impact and relationship with arts-based pedagogies or natural environments in this work.

Another conceptualization of engagement which considers the process of engagement comes from drama and teacher education researchers Morgan and Saxton. Through their practice and research they identified a number of levels of engagement that students may move through (Morgan and Saxton 1987). They describe a taxonomy of personal engagement which includes:

- attention and interest
- involvement and engagement
- responsibility and commitment
- internalisation
- interpreting, and
- evaluating.

This work suggests that engagement is therefore more than a number of factors, rather it is a process that combines strategies for capturing student interest and attention and motivating them through involvement and commitment to cultivate internalised learnings. The nature of the activities that triggered engagement and processes that promoted learning were therefore the focus of this research study.

Engagement frameworks have not been explicitly used in a lot of Environmental Education

research to date, however, in his extensive review of Environmental Education research, Rickinson (2001) identified that more research needed to focus on specific processes and the nature of learning, acknowledging the role of learners as active agents in learning processes. He also reported on a growing body of qualitative research which signalled positive impacts from learning programs that were action-oriented, including outdoor and out-of-school activities, that may include community involvement and authentic content.

The value of this type of approach is supported by Tilbury (1995) who in what has become foundational work, asserts Education for Sustainability (ESD) in schools benefits from the inclusion of active learning strategies. These include games, role-playing and simulations as well as discussions which respond to stimuli such as artefacts, photos, media or personal experiences (Tilbury, 1995). Such strategies empower learners to be creative and take responsibility for their own lives as well as for the environment. The importance of encouraging children and young people to become empowered and mobilised to act for the environment and engage in localised sustainability action has been reinforced by the 2014 UNESCO World Conference on ESD and Roadmap for Implementing Global Action for ESD (UNESCO 2014). There is also a strong recognition that to achieve this requires pedagogical approaches that provide children and young people with participation and agency options rather than transmissive models of information dissemination (UNESCO, 2012).

Dealing with environmental and sustainability issues, such as climate change, can seem complex or too abstract for children, so within the ESD literature there is a growing recognition of work that encourages students to connect to "place" as a starting point. Through appreciating and understanding a given location, an entry point can be established for considering the local and global problems we are facing (Gruenewald 2003; Judson 2010; Sobel 2004; Traina 1995). Relevant research about primary school children's attitudes towards the environment and sustainability has indicated the importance of students having interactions with the environment and opportunities for participation and action (Bonnett and Williams 1998; Eagles and Demare 1999; Ernst and Theimer 2011; Wals and Jickling 2002). For this particular case study, the focus was therefore on encouraging teachers and students to actively engage with their local environment and community and begin with place-based strategies as championed by researchers such as Somerville and colleagues (Somerville 2008; Somerville, Davies, Power, Gannon and de Carteret 2011).

The importance of helping students make connections through sensory and experiential learning via active, creative and arts-based processes is highlighted by a growing body of research in both the arts and environmental education fields (Cutter-Mackenzie and Smith 2003; Gale 2008; McNaughton 2004; 2006; Smith and Sobel 2010; Upton 2011). Smith and

Sobel identify the importance of engaging students in meaningful tasks with student action and ownership (Smith and Sobel 2010), while Burke and Cutter-Mackenzie used fictional texts and picture books to encourage environmental awareness and agency (Burke and Cutter-Mackenzie 2010) and other approaches using folk stories and cultural knowledges were used to explore environmental issues in Botswana (Silo & Khudu-Petersen, 2016). Likewise, there is a significant body of work building which has explored the use of visual arts processes and practices for exploring human relationships with the environment and connection with it. This work often highlights arts-practice as a different form of "knowing" and means for understanding and appreciating landscapes and the environment (Anderson 2000; Birt *et al.* 1997; Blandy and Hoffman 1993; Gablik 1991). A number of case studies and project reports also describe the ways that drama and theatre processes have been used to explore specific environmental issues. They identify active processes which engage participants through fictionalised, but life-like experience which bring together the cognitive and affective domains (Gale 2008; Hiltunen and Konivouri 2009; Upton 2011).

This specific environmental art-based project therefore sought to enact a localized, place-based program, which built student environmental awareness and knowledge through a range of arts-based pedagogies. The specific research inquiry was concerned with the nature of student engagement and pathways to learning. This is also the type of enquiry which could provide a model for approaches to learning in STEM (Science, Technology, Engineering and Math) or STEAM (with the arts at the heart), given the increased profile of such around the world.

Research Methodology and Process

For this study, the research methodology used was a case study incorporating multiple methods (Cresswell et. al. 2003). The data generated was qualitative, drawing predominantly upon student written reflections, student focus group interviews using art-based products to stimulate recall, and teacher focus group interviews (which have not been drawn upon for this article, but which informed data analysis and interpretation). The author of this paper also attended the school on a weekly basis throughout the project making observations, collecting documentation and assisting in classroom activities upon invitation.

The research questions that informed the study were as follows:

1. How can different arts-based strategies be used to help increase student engagement with the environment and sustainability issues?
2. What is the nature of student engagement through the TreeMappa project and what factors do students identify as most engaging?
3. What is the nature of the learning that emerges for students from the project?

Research ethics approvals were required at the university and education department levels. Approvals were granted and consent packages were provided to the school principal, the teachers, parents/caregivers and the students themselves.

As the main researcher was also a participant in the project at various times, two other researchers were involved in the interview process to reduce the potential bias of the researcher. These two researchers had no previous contact with the students or teachers, but conducted the interviews and also reviewed the coding of data and identification of themes and findings.

Instruments. A set of common instruments were designed to be used with the students. A reflective tool was created that allowed for students to write and/or draw their responses (see Figure 1). This was completed by the students several months after the conclusion of the project. The tool featured a type of Y chart with three main questions that related to the three different domains of operative (physical/doing), cognitive (thinking) and affective (emotions and feelings) as identified in the engagement research. The prompt questions on the reflection tool included:

- What activities and experiences were engaging (made you interested and feel involved)?
- What did you learn from the project?
- How did the things you do make you feel?

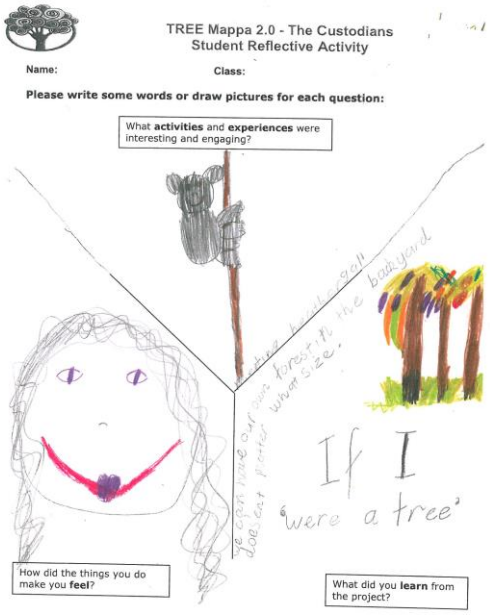

Figure 1. Example of student reflective tool

An interview protocol was designed including common questions and a process to be used in the interviews. The interviews were conducted with the two older class groups only. Students self-nominated or were asked by their teachers to participate, with the intention being to interview a range of students who demonstrated varying levels of engagement. The guiding questions were as follows:

(1) Could you please talk about any times that you felt engaged (interested and involved) with this unit?
(2) How did you feel about the project/unit at the beginning?
(3) Your class did some different work (show drawings or video clip or photographs). Describe something that you did. Talk about what you thought about this.
(4) Did your feelings about the project change at all throughout the process? If so when and why?
(5) Overall, what was the best part of the project and why?
(6) What was the worst part of the project and why?
(7) What did you learn or get out of the project?

A set of images drawn from documentation collected during the project was used to stimulate student recall of events, feelings and learning.

Data analysis. The first phase of data analysis focussed on the reflective tool data and transcribing what the students had written and drawn into a table. An initial pass by the author identified similar words and thematic clusters. These were then named and colour coded. These were crosschecked with the other two interviewer/researchers. An extract of one of the tables used in that process is included with Figure 2.

TreeMappa Engagement Research - Reflective tool responses- Coding

Coding keys

Engaging activities (themes)	How feel (themes)	What learnt (themes)
Environment/ecologies/trees Outdoors activity Excursions Arts-based activity Outside 'experts' and elders	Positive Mixed Negative	Arts related learning Environment related learning Nothing/not much

Class - 5

Gender	Activities/Experiences engaging	How Feel	What learnt
F	Looking at plants in the garden	Surprised	Trees are important
F (NESB)	Going to the beach	Wasn't interested in the tree	I didn't really learn anything
F	Going down to the beach Drawing the pandanus tree Freeze frames Took photographs Drew illustrations for photostory	Helpful to try to get rid of bugs	That pandanus tree was used for medicine
M	Drawing		All different facts about trees
M	When we drawed a picture	Curious	The pandanus trees were getting eaten by bugs
F	Freeze frames were fun and a little funny	Fun, interested, thoughtful	Plants and trees are important
M	Going down to the beach and drawing	Disengaged	It wasn't my thing so really not much
F ESL	Problem solving – circle wheel about	It made me like trees more	That trees are living creatures and that they

Figure 2. Example of initial coding

The focus group interview data were also transcribed, and then coded and analysed separately. They were analysed in response to the guiding questions and then data sets were independently reviewed by the other two researchers to check the validity of the initial categories. The interview data provided more insight into what students found engaging and the features of some of the triggers for initial engagement and processes that deepened or changed the nature of that engagement. It was also possible to cross-reference some of the data, and correlate specific responses of students in the focus groups with their reflective tool data. This enabled the researchers to identify how some students shifted in their sense of engagement and commitment across the course of the project. Data was further triangulated by also sharing the data back with the teachers who confirmed the identification of factors and issues.

School based context and implementation. The research was conducted in one primary school based in an urban coastal community. The school has approximately 500 students and was deemed "average" in terms of socio-educational advantage. A small proportion of the students were identified as Indigenous (3%) and 6% of students from a Language Background other than English (ACARA 2012). Four teachers nominated to be involved in the project (and related research agenda) as they felt it was relevant to them individually with interests they

had in the arts and/or environmental education. Three of the teachers were female with over 15 years' experience, the fourth teacher was a male teacher who was in his third year of teaching. One of the female teachers involved was a teacher librarian who had taken on a mentoring role in the school supporting arts-based programs. The three classes involved were one year 3 class, one year 4/5 class and one year 5 class. For the research phase of the project 68 students completed the reflective tool, and of those 27 took part in the focus group interviews. See Table 1 for details.

Table 1
Numbers of student responses

Year Level	**Number of girls**	**Number of boys**	**Total**
Reflective tool responses			
Year 5/6	10	15	25
Year 4/5	8	12	20
Year 3	13	10	23
Total	**31**	**37**	**68**
Focus group interviews			
Year 5/6	7	5	12
Year 4/5	7	8	15
Total	**14**	**13**	**27**

After an initial professional development session hosted by the researchers, the teachers then planned a range of learning experiences relevant to their class. The idea was to select a tree and aspect of the local environment or history to explore, and then choose arts areas to work with. The specific curriculum areas teachers targeted included The Arts as well as English, Studies of Society and the Environment and Science. Class specific learning programs were then designed to be implemented over one school term (approximately 10 weeks long). See Table 2 for details of the focus for each class.

Table 2
Specific education and experiences focus for each class

Year Level	**Year 3**	**Year 4/5**	**Year 5**
Teacher	Experienced female teacher with Environmental Education background	Male teacher, several years graduated, interest in media and technology	Experienced female teacher, interest in extending use of arts processes
Tree focus	Local wallum scrub ecosystem Animals that live in the ecosystem	Norfolk pines planted on the beach foreshore	Pandanus tree and the dieback problem

Arts focus	Charcoal drawing Creating dance for "If I were a tree" song Taking photos and making photostories	Charcoal drawing Poetry writing Creating photostories Dance sequence performed on esplanade	Charcoal drawing Drama activity to explore solutions Photostory using drawings
Outdoor or out of school experiences	Excursion to the bookfarm and meeting artist & author Walking in rainforest	Excursion to the bookfarm and meeting artist & author Walking in rainforest	Walk to the beach to draw Walk in wallum scrub with local plant expert

To help provide a common umbrella for the different class activities, a common pre-text (O'Neill 1995) or springboard was developed to initiate the project and act as a call to action for each group. Through discussions between the researcher and the teachers it was decided that each class be invited to become "custodians" of their tree and to document and share stories about it. This framing was enacted through the researcher attending the school as a "teacher-in-role," a strategy that comes from the field of drama in education. With this strategy a teacher or leader takes on a fictional role and interacts with students within a created context to explore relevant issues and problems (Heathcote and Bolton 1995; Morgan and Saxton 1987; O'Toole 1992; Wagner 1976).

A specific role was developed (and was played by the author), that of "Dr Rita Strong, an environmental anthropologist." The teachers invited her in to initiate the project and explain to students that there was a pressing need to document the stories of significant trees around the world. Dr Rita then attended a school parade and shared a presentation with images of a range of interesting and amazing trees from around the world, asking what Australian and local trees could be added to this list. Students were invited to then become custodians for a particular tree. This strategy was planned to act as a prompt for cognitive engagement and a gateway into the affective and operative fields of engagement. An excerpt from Dr Rita's presentation follows:

> Dr Rita: Good morning students. My name is Dr Rita Strong and I am an Environmental Anthropologist with the Tree-Mappa program. We are an international research group finding out about "special" trees. We need to gather stories about the world's significant trees as in the future we may lose many of them because of global warming and climate change. We need custodians to record and interpret these important stories and share them with the world. We don't accept just anyone though, to become a member of our hand-selected team you need to apply to become a "custodian" for a special tree in your region. You must commit to investigating its significance and to share what you find with others. Who is up to the challenge?

After the presentation, each class subsequently developed role cards and identified a specific tree or ecosystem to focus on, and artforms through which to document and share their tree stories.

Figures 3 & 4. Examples of student charcoal drawings, year 3 and year 5

Experiences and Findings from the Data

Key findings from the reflective tool responses. As previously identified, two months after the project had concluded students were asked to complete a reflection tool on which they could draw or write their responses. Questions asked students to identify experiences and activities that they were engaged by. The data from this tool was tabulated by the researchers and the same and similar words were colour coded and counted. The analysis of the written/reflection data identified students reporting that their engagement was activated by a number of key factors, including:

- Arts-based learning and processes
- Excursions and out of classroom activities that took them out of the classroom; components of these saw them interacting with nature and learning about nature; and
- Meeting outside experts including an author, an artist and a veteran resident of the area.

While the teachers found the identification of the active learning processes suggested by the first two categories unsurprising, the final category of meeting and interacting with "experts" in various fields was more unexpected, but signalled the children's appreciation of learning from people who are knowledgeable in their fields. The following table summarises the student responses and percentage of students who identified that factor as engaging.

Table 3
Specific engagement response indicated on reflective tool

Year Level	Year 3 N= 23	No. #	Year 4/5 N=20	No.	Year 5 N= 25	No.	% identifying this factor
Art making	Charcoal drawing Taking photos and making photostories	11	Charcoal drawing Creating photostories Dance/movement sequence performed on the esplanade	14	Charcoal drawing Drama activity to explore solutions Photostory using drawings	20	56%
Outdoor or out of school experiences	Excursion to the Bookfarm	2	Excursion to the Bookfarm	13	Walk to the beach to draw	18	50%
	Interacting with nature	2	Walking to the beach to see Norfolk Pine	3	Walk in wallum scrub with local plant expert	1	9%
Meeting experts	Meeting a real life author and artist (at the Bookfarm)	18	Meeting Webby	2			29%

 # Number of students who identified this experience as engaging. Note that students could write down multiple instances.

What was apparent from this data was that students were engaged by those activities that provided them with opportunities to make and do things. This extended to many of their interactions in or with nature.

The question that sought to ascertain their emotional response and connection to the experiences revealed some interesting findings as well (see Appendix A). Many students identified positive feelings and emotions towards the experiences, most notably using words such as “happy” and “excited.” There were a number of students who described mixed feelings (it was a bit boring but okay) or emotions that aren’t really positive or negative, such as feeling nervous, especially when they had to perform their work. A small but significant number wrote that the experiences had been boring or bad. What is notable about this finding is that these responses were all from boys and increased for the older year levels.

The final question on the written reflection asked students what they had learnt. The responses here largely reflect the learning intent of the teachers and the specific tree or ecosystem focus their class studied. 79% of students identified characteristics or learning about trees or nature-related learning (see Appendix B).

Most students in the year 4/5 class and year 5 identified that they had learnt about their specific tree (Pandanus and Norfolk Pine) and some listed specific characteristics or issues. A number of students made comments about learning about the importance of trees and facts about trees. The year 3 students identified learnings more related to specific creatures they had encountered, seen or drawn, reflecting their focus on ecosystems. They also mentioned the fact that it is possible to plant a forest (and create an ecosystem) anywhere. The year 3s were also the ones most likely to identify arts-specific learnings, in particular they discussed the drawing with charcoal and learning the song and dance they performed. What is significant about those who identified that they learnt nothing were that they were generally the same boys who said the project had been boring or negative. Several of them did, however, identify some specific tree learnings having emerged from the project.

From the data compiled from this reflective tool, it can be argued that for the majority of students the project had provided them with engaging experiences and these related to them having outdoor and out of school experiences. Importantly though, the use of various arts processes helped provide them with the *frame* for engaging with the environment. They also provided the means of processing that experience and creating a product (for example creating a dance, a drama presentation, or a photostory). The learning outcomes they identified tended to be in the environmental area, more so than the arts, which would indicate that they saw the arts as a vehicle for learning and experience. Of considerable note was a number of students in the older classes who reported they did not find experiences engaging and didn't learn anything. These students were all boys. Discussions with the teachers about these students revealed that some of them had a history of problems with academic learning and negative experiences of schooling. Teachers saw their negative responses as typical of their attitude to school in general. Drawing on the little "e" and Big "E" model, it would appear that these boys in the main did not feel that school was for them. It is difficult to tell therefore whether the attitudes of these students reflect their attitudes to the environment and the arts, or more generally as related to their relationship towards schooling.

Focus group interview findings. The follow up focus group interviews were conducted with a range of students, invited by the teachers to participate with the intention of representing different attitudes and responses. The material from those interviews reinforced the categories of experiences students found engaging, and the features of what they had learnt as identified through the reflective tool. What was also evident from analysis of these transcripts was more

detail about the process or pathways of engagement for students. This showed how some came with an initial interest in the environment, while for others interest was not there initially but was stimulated and then grew into involvement and commitment. This reflects some aspects of Saxton and Miller's engagement taxonomy, indicating some of the ways that attention and interest was generated and then moved beyond.

Arts, Environmental Learning and "Triggers" for Engagement

What was evident from this analysis was that while a small number of students began with some initial interest in the topic of "trees," nature or growing, some were not at all interested initially but became connected through a number of other means. The following section therefore elaborates on the "triggers" for engagement that lead to further commitment. The main triggers identified were as follows:

- Connecting to the idea of the work through personal background and interest
- Out of classroom experiences framed by arts processes and a sense of agency
- Interactions with domain experts
- Arts-based action leading to committed engagement.

Connection to the idea through personal background and interest. A small number of students made connections to "the idea" of the unit very early on, they had an initial interest in the topic and were motivated to be involved in the unit. Some of the ideas students reported connecting with included having prior knowledge and experience with trees and growing food. There was a cognitive and affective connection and a pre-existing interest or experience with environmental issues. These students were open to different activities and could identify the relevance to them:

> Dee: Yeah, and I like growing trees and stuff. I've got my own vegetable garden and that's really fun. I'm interested in trees.
> Bee: I like trees and how things grow on trees. My Mum cooks like – all vegetables and stuff, herbs, yeah.

Key triggers for this type of engagement were a connection to the idea of the work (e.g. an interest in trees and nature) or connection to prior experience. The students were motivated to be involved in the activities and could build on existing concepts to extend their knowledge.

Out of classroom experiences framed by arts processes and a sense of agency. A theme that emerged strongly from the focus group interviews was how much students appreciated moving out of the classroom, going on excursions and walking down to the beach (which was

only several hundred metres away). This category also links to that of interacting with the environment and nature as in most cases that was the purpose of the experience.

Two classes walked to the local beach, one to look at trees, to identify their features and draw them. Another class took cameras to the beach and captured photographs of their selected tree to make a photostory, accompanied by poetry that they wrote. The third class worked in groups, whose task was to take a series of photographs of one tree in the school grounds to create photostories. They also had a focus on ecosystems and so photographed and drew birds, insects and other creatures apparent in that system. While these environments were readily accessible and places students could go every day, having the frame of the specific arts-based activities helped focus their attention and appreciate what was just outside their door:

> Interviewer 1: What was the best thing for you?
> Student 6: Well going down to the beach and um
> Interviewer 1: Why?
> Student 7: Well I like enjoyed - my favorite part of the project was probably going to the beach, like just drawing the pictures, and now like, when I look at the pandanus trees, they look really cool and everything, like how the roots come out of it.

The experience of having to draw or photograph the trees required the students to look at the trees very carefully. They had to focus their attention and commit to observing and doing. This activity was significant for both increasing their artistic skills but also their scientific learning as many of them could clearly recall the specific parts of the trees they drew and their special features. Their attention was focused for a much longer time than if they had just gone to look at the trees and have someone talk to them. This notion of focused attention and providing a purpose and frame for committed interactions emerged as significant from these findings.

What was also important about these experiences was that they were "novel" and different from everyday classroom experiences. Students reported that they learnt things from experiences that were "fun" and different from "normal" school learning, which was "not fun." Across the interviews and reflective comments, students were unanimous in their identification of being engaged when they left the classroom and that these learning experiences impacted positively on their learning:

> Interviewer 2: What's the difference?
> Student 8: It's like you actually get to go outside and like other kinds of things you usually stay in the classroom or around the school kind of thing.

> Student 9: But Maths and Science, you don't really do much; you just sit in the class writing in your book. When you're actually learning like this … it's better.

Many students described routinized learning that occurs as part of the school day as not being engaging and some boys in particular spoke of their enjoyment of more active and outdoor learning. These comments highlight the significance of the physical environment, novelty and physical activity for breaking routines and activating student learning.

Interactions with domain "experts." Another finding emerging from the reflections and interviews was the significance of interactions with outside "experts." These interactions were important for engaging students, connecting them to ideas and stimulating their learning and cognitive engagement. Groups had interactions with different people and these included:

- a "real" writer and artist met on the "Bookfarm" excursion;
- a long time local resident who knew about the history of the Norfolk pines planted on the foreshore;
- environmental group representatives who knew a lot about native vegetation and helped identify the trees in the school grounds;
- the researcher taking on a role as an 'environmental anthropologist' introducing students to information about different trees and their features.

These visitors were able to complement and extend upon the knowledge base of the teachers, and in some cases extend the skills base of students as well. Students reported enjoying these interactions, and they recalled quite a lot of detail. For example, they remembered a lot of information from Dr. Rita's talk, but the active experiences that followed further sparked their interest:

> Student 11: Pretty much it gave me - well I don't know about anybody else, but it gave me a whole lot of other understanding of trees, and how they help us a lot. Well, that's when trees got interesting for me. And then we started going on excursions and it all got fun.

Arts-based active learning leading to committed engagement. For most of the students interviewed, the arts-based experiences were important for leading towards more committed engagement and involvement. Many students appreciated those activities that were active (high operative) and where they had a sense of agency. For example, students said they enjoyed having to create a dance themselves, that they had to "make it up." It later emerged that teachers did provide considerable scaffolding for the activity, however, students evidently

felt a great deal of ownership and a sense of achievement about what they had learnt and created:

> Interviewer 3: Who taught you? Your teacher?
> Student 1: No, we had to figure it out for ourselves.
> Student 2: We had to make it ourselves.
> Interviewer 3: So how did you do that?
> Student 3: Well, one of our group tried it, and sort of figured out that it worked.

Another class group had one lesson where they engaged in exploring issues through drama conventions. Even though this had not been a particularly extensive experience some students still appreciated the agency this activity offered them:

> Interviewer 3: So girls, why did you get so interested when I said drama?
> Student 4: It's because - you get to act and everything.
> Student 5: I like the making up part. It's like … because, you get to be whatever you want...

These activities enabled students to work with each other and their teachers, to draw on their growing knowledge about certain trees and to make decisions through different expressive modes.

Conclusions

This research project focussed on exploring student engagement and learning emerging from an environmental and arts-based project enacted in a primary school setting. The process of engagement through arts-based learning, leading to attention, commitment, creative engagement and meaning making is represented through Figure 5, which uses a tree graphic beginning with the external features and activity represented on the leaves, moving through to the "grounded" learnings which reside in the roots. The findings from this research project indicated there were different triggers for engagement through which students connected with ideas and experiences. Most significantly the use of arts-based processes and creation of arts products provided a purpose and frame for their engagement with the natural environment. For example, by having to draw the Pandanus tree in its location, this provided a frame for them to engage with and notice the natural environment. For the year 5 class, for example, this experience was identified most often as highly engaging as compared to the experience whereby they walked around the school's wallum scrubland attempting to locate and identify specific plants.

Figure 5. The engagement tree for arts-based sustainability learning

Initial attention and interest was then extended upon through interactions which required a form of creative engagement and commitment, student ownership and control as they developed various creative products. These processes contributed to active learning experiences and significant learnings. The learnings the students recalled were predominantly environmental or science-based learnings as well as arts learning and some students signalled changes in attitudes.

As to implications for the planning of environmental and sustainability learning programs, the findings suggest that a consideration of different triggers is required for "hooking" in student attention and interest, recognising the potential of using arts-based activities to provide a purpose and frame. These experiences can assist with turning interest into committed interactions, creative engagement and learning. The focus on local trees and arts-based processes and outdoor experiences provided the means of engagement for a majority of students this lead to committed interactions and meaningful learning. This was a dynamic process involving (but not necessarily beginning with) internal motivations and external interactions and through the interplay of these the arts worked as frames enabling focussed interactions with the natural environment and more than human world. Feedback from children indicated these ways of learning were hugely underutilised in schools at present. The evidence emerging from this project signals however, the huge potential for such processes and their ability to transform the educational experiences and learning for students through creative, active and interactive pedagogies.

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About the Author

Susan Davis is Deputy Dean Research in the School of Education & the Arts at Central Queensland University, Australia. Her research has focused on drama, engagement, digital technologies, cultural-historical theory, sustainability and scriptwriting as research. She has been involved in a range of environmental arts-based projects such as the NeoGeography creative place-making project, Floating Land green art festival, Treeline, the Water Reckoning and is currently co-curating a range of exhibitions and activities under the banner of Wild/flower Women: Arts, environment and activism. She is the current Co-Convenor of the

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Appendix A

Responses to "How did it make you feel?"

Year Level	Year 3 N= 23	No.	Year 4/5 N=20	No.	Year 5 N= 25	No.	% identifying this factor
Positive	Happy	19	Happy	7	Happy	4	69%
	Excited	14	Excited	10	Surprised	2	
	Creative	6	Fun	4	Fun	2	
	Great	2	Smart/interested	2	Learnable	2	
	Privileged	3			Curious	1	
			Good	2			
Mixed	Nervous	6	Embarrassed or nervous	3	Pretty good	2	13%
					Kind of bored	2	
Negative			Bored	5	Bored	5	18%
					Uninteresting	2	

Appendix B

Responses to "What students identified that they learnt"

Year Level	**Year 3 N= 23**	**No. #**	**Year 4/5 N=20**	**No.**	**Year 5 N= 25**	**No.**	**% identifying this factor**
Nature related learning	Specific animals About forests, growing your own forest	15 7	Norfolk Pines All about trees	5 8	Pandanus Importance of trees	11 7	79%
Arts related learning	About charcoal & drawing If I were a tree song/dance	6 6	Performance aspects	2	Drawing trees	1	19%
Learnt nothing or wrote nothing			Nothing	5	Nothing	6	16%

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