

Beyond Aotearoa New Zealand: Exploring the creative and pedagogical possibilities of STEEAM through play based learning, ‘working theories’, and the eyes of others

Report by Janette Kelly-Ware

Recipient of the Margaret May Blackwell Travel Fellowship (2019)

Acknowledgement

Thank you to the Trustees for the incredible opportunities that being the recipient of this prestigious travel fellowship afforded me. I have been able to undertake an in-depth study into an area of educational importance that would not have been possible without the generosity of the travel fellowship.

Itinerary

My itinerary was divided between several continents. The first six weeks were spent between Abu Dhabi in the United Arab Emirates, Umeå in Sweden, Amsterdam in the Netherlands, Berlin in Germany, and Geneva in Switzerland (mid October - late November). On the second leg of the trip I spent four weeks in rural and central Melbourne and finally Perth in Western Australia (late November - December). Several alterations were made to my original itinerary based on some people's unavailability, or other possibilities arising during my trip¹.

Study topic

My study topic focussed on STEEAM which has its origins in STEM - an integrated approach to teaching and learning typically in Science, Technology, Engineering and Mathematics disciplines. However, increasingly Environmental Education and the Arts are being added to the mix. I also chose to add in these disciplines based on my teaching and research interests hence the STEEAM acronym as my focus. I have since discovered other acronyms such as STREAM and METALS which involve the addition of Reading and/or Literacy. Two academics who I visited in Perth, Western Australia explain that,

the connection with the arts is important to demonstrate links between problem-solving and creativity, while the addition of reading and/or literacy reflects the focus of much of the curriculum to these areas of learning. The inclusion of literacy also shows the connection of scientific literacy (the everyday knowledge of science and scientific language) and numeracy (the representation of mathematics through symbols) (Knaus & Roberts, 2017, p. 4).

¹ I was granted Research and Study Leave (RSL) from the university where I work from 14 October until 20 December 2019 so the Study Tour lasted approximately 70 days. Whilst I was officially on RSL, unfortunately I still had academic (work) responsibilities, including post graduate supervision and examiner's reports, end of year student grades, revising journal articles post reviewers' feedback, as well as presenting about my broader research when I was being hosted at other universities, during my time off campus.

I was unsure how all four (or six) disciplines could be integrated into one learning experience theoretically until I read their explanation that, “the term STEM can be used when any two of the four subjects are related through an inquiry, a project, or a hands-on activity” (Knaus & Roberts, 2017, p. 3). This explanation clarified what I knew was possible in practice.

At the outset of my Study Tour, I was particularly interested in investigating how these various STEEAM disciplines were integrated in:

- Early childhood/ early years pedagogy (in centres, kindergartens, pre-schools and schools with children aged 0-8 years),
- Public spaces such as playgrounds, libraries, galleries and workshops with artists, inventors and gallery staff, and
- Work by my peers - university academics and researchers.

Visits and related activities

Over the ten weeks, I visited 5 early childhood/ early years schools and centres, attended a conference in the Netherlands, and spent time in 9 art galleries/ museums/ ateliers/ workshops/ laboratories in 6 different countries looking specifically at interactive exhibitions, art exhibits and classes for young children. Whilst the teaching and learning in these settings was not always explicitly about STEEAM, the combination of the arts, technology and (scientific) inquiry was ever present. I have liaised with staff in many settings I visited over the contents of my report particularly the mini case studies which will be reproduced in *ecARTnz* an e-magazine for ECE teachers focussed on visual arts.

As I am employed as an academic lecturer and researcher at a New Zealand university, I also spent time as a Visiting Academic in three universities with academic peers, involved in research and teaching around STEEAM subjects

- Umeå University in Umeå in the mid-northern region of Sweden
- Monash University, Peninsula campus in Frankston, Victoria, Australia
- Edith Cowan University, Mount Lawley campus in Perth, Western Australia

I also spent time with colleagues from two other universities in Melbourne, Australia - Melbourne Graduate School of Education and Royal Melbourne Institute of Technology (RMIT) talking about possible research collaborations in this and other areas.

Summaries of my visits are presented chronologically in this report. Under each country, where applicable I provide mini case studies including photographs and a brief commentary about the creative and pedagogical possibilities of STEEAM that I observed that may be applicable in this country. In many instances these mini case studies are draft articles for a Special Issue of *ecARTnz* that I am the guest editor of.

Abu Dhabi, United Arab Emirates - October 2019

In Abu Dhabi I visited the ECE section of the Sheik Zayed Private Academy for Girls. Owned by Sheik Zayed but managed by an international company, girls and boys attend the junior school which is staffed by an international team of ECE teachers. When I visited the ECE staff had just undertaken Lego Education Professional Development where they experienced how they could help children develop early science, technology, engineering, art

and math (STEAM) skills. This involved understanding cause and effect relationships, making predictions and observations, problem-solving, develop imagination, creating representations role-play and collaboration and much more.

Teachers and children were also involved in the Bright Start Arts Intervention with Dr Gai Lindsay, one of my International Art in ECE colleagues from the University of Wollongong, Australia. This programme is described as:

Arts exploration and developing identity in the early years is a multi-year campaign in the Middle East region which aims to raise awareness amongst parents and ECE educators about the importance of early arts and creativity for children aged 0-5. In support of this broad goal, the project includes the design, delivery and evaluation of professional development in the domain of early childhood arts and creativity for practicing early childhood educators and professional gallery educators (see <https://familyacademymena.org/initiatives/early-arts-intervention/>).

A day at Louvre - Abu Dhabi enable me to be immersed in this highly aesthetic building and the exhibitions, paying special attention to the Children's Museum and Toddler Space. Unfortunately there were no students visiting the ateliers downstairs on the day of my visit so I was not able to see the professional gallery educators at work.



Image: Child exploring dress-up costumes.



Image: A parent relaxes in the toddler space with her infant

The museum describes its programme thus:

Children are inspired to learn about art through challenges and fun at the Children's Museum. They create their own avatar, then go on an interactive journey exploring costumes seen in artworks, with fun challenges to try. There's lots to discover with hands-on learning that nurtures curiosity and creativity. And history comes alive when children try on the beautiful replica costumes handmade from Paris, to transform into a new character. Designed for children aged four to ten, it's ideal for school groups or family visits. The Children's Museum also serves as a bridge to

the rest of Louvre Abu Dhabi, helping young visitors to get the most out of the museum's focus on universal human themes. Families with younger children can also enjoy our new toddler space. Here children under the age of three can explore costume through simple construction games and activities (see <https://www.louvreabudhabi.ae/en/art/childrens-museum>)

Umeå, Sweden - October 2019

During my visit to Umeå I spent time at the Public Library which was an amazing child-friendly space. I also visited the Västerbottens Museum to explore their interactive exhibitions and inspect the displays. I was greatly impressed by how the decorations on the indigenous Sami people's drums recorded in Manker (1950) mirrored the engravings/rock art found by archaeologists in Alta, Norway between 4-6,000 years ago. This visual representation and caption was powerful reinforcement of the length of human habitation especially in Europe, and the cultural significance of drawings, and their ability to help with meaning-making about human and non-human others, places and things.



Image: Me in the Children's section, Umea Library



Image: Sami drum illustrations contrasted with engravings/rock art

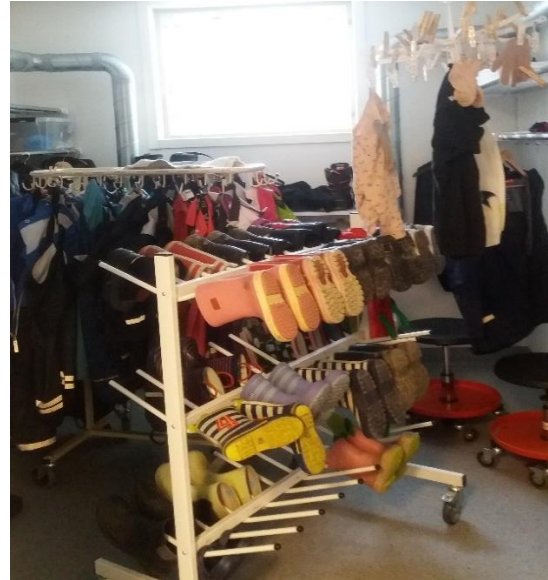
My study topic led me to spend a week with Dr Sofie Areljung and her teaching and research colleagues at the University of Umeå. Sofie's current five-year research project involves a number of Swedish preschools (including Förskalen Karet which we visited) is entitled 'What are the pedagogical possibilities when Art meets Science in Swedish preschools?' Interestingly, Sofie's next project funded by a prestigious Swedish Research Council grant is called 'Drawing to learn and learning to draw in science' with 6-8 year olds. Our ongoing discussions made it clear that STEAM is alive and well supported in Swedish schools and preschools.

The following case study describes practices I observed at Förskolan Karet.

Verb-based science-arts education in practice in a Swedish preschool

Förskolan Karet - Umeå

With Sofie Areljung and Markus Johansson

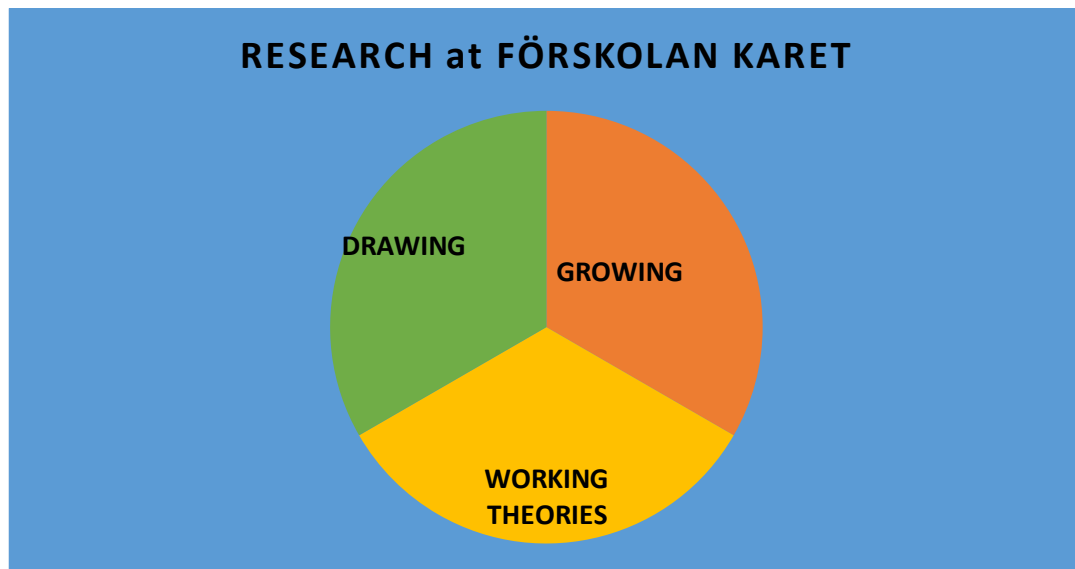


Despite the snow covering the playground, the children still went outside to play at Förskolan Karet - a preschool in Umeå in north-east Sweden in October. These outings were testimony to what we know as the Nordic mantra ‘that there is no such thing as bad weather, only bad clothing’. The drying room reminded me of a ski- lodge with lots of hooks, racks and heating to dry toddlers’ and young children’s outdoor clothing.

Inside there was what I came to view as Scandinavian design combining function and aesthetics – warm, soft lighting, and white walls. Children were engaged in numerous experiences in a range of different spaces. Our host for the visit was the preschool teacher Markus Johansson and he showed us around the large, well-laid out preschool.



Sofie Areljung from Umeå University was engaged in collaborative research with Markus and his colleagues that focused on Science and Aesthetics (the Arts). Her previous research had focussed on teaching science using verbs (Areljung, 2016). Sofie's provocation to each of the ECE research sites in this project was to focus on an aesthetic mode of expression, a verb related to science, and young children's working theories (a construct from the Aotearoa New Zealand early childhood curriculum *Te Whāriki* that Sofie had borrowed to help Swedish teachers support children's ongoing theorising in science).



As Markus and his colleagues had chosen 'GROWING' as their science verb, the Atelier at the preschool had been converted into a garden, and the Laboratory was filled with fiction and non-fiction picturebooks, images and other documentation about their research project related to DRAWING and GROWING.



Image: The atelier converted into a garden



Image: The Laboratory for further research

Markus reported that children's drawing of plants had originally begun with the flower, and then a stem downwards from the flower, ending at the ground level. And then a child split a big white bean in half and saw where the growth came from. Other beans in various stages of growth were also split open so that children could see the source of the plant. The children were also learning about casual relationships, that is cause and effect, as they watered the growing plants on a daily basis. With the trough at a good height for young children they could closely position themselves to see what was going on. They were able to move the soil aside and actually see each plants' roots growing downwards in the long trough, while the plant grew upwards. This process enabled the children to better understand and draw what they were seeing.

Teachers reported that over time the children's drawings became more complex – changing in composition from only including what they saw above the soil to the entire plant from the bean or seed, the roots and the growth about the soil – more like a botanical drawing. When the teachers looked closely at the drawing processes, they could see that many of the children no longer started their drawings with the flower, but with the bean. Instead of the stem “growing” downwards from a flower, they drew it upwards from the bean. During the project teachers documented children's working theories and made copies of their drawings in order that the children's learning could be seen over time. We conclude that the arts may help children to communicate and explore science phenomena, as well as sympathise with nature's goings on.



Image: Teachers' documentation of children's drawings

Further reading:

Areljung, S. (2016). Science verbs as a tool for investigating scientific phenomena – a pedagogical idea emerging from practitioner-researcher collaboration. *NorDiNa*, 12(2), 235-245.

Areljung, S. (2019). Science-arts as verbs: New figurations in early childhood. I.P. Burnard & L. Colucci-Gray (Eds.), *Why science and arts creativities matter: STEAM (re-)configurings for future-making education* (pp. 148-165).. Leiden, Netherlands: Brill Publishing.
doi.org/10.1163/9789004421585_010

Hall, E. (2014). Unique ways of seeing: Five children's approaches to observational drawing. *International Art in Early Childhood Research Journal*, 1, 1-16.
http://artinearlychildhood.org/journals/2014/ARTEC_2014_Research_Journal_1_Article_6_Hall.pdf

Amsterdam, the Netherlands – November 2019

During my visit to Amsterdam I was a guest of Sabine Plamper, an art teacher and arts advocate. I attended several art classes with toddlers (see case study that follows) with tertiary students visiting from Belgium.

I also attended a conference called *Leve het Jonge kind: Long Live the Child* in Utrecht. There were several keynote addresses (that were unfortunately for me in Dutch), however I was particularly interested in what Helma Brouwers, an early childhood specialist, had to say. She was warmly received by audience of Early Years teachers as she spoke about play-based learning in ECE and the importance of a focus on autonomy, wellbeing and belonging especially as the population becomes more ethnically diverse. She contrasted this curriculum and pedagogy with the academic expectations of formal schooling. My colleagues quietly translated for me and I heard about the importance of research, and about asking dialogical education questions such as: What does good teaching and learning look like in early childhood education? And what kind of education should young children aged 4-6 years be experiencing? It appears that the government's 1985 decision to educate 4 and 5 years olds in primary schools is still controversial.

Thankfully in Aotearoa New Zealand, schools are looking to ECE to find out more about how to implement play-based discovery/ inquiry learning in junior classes in an effort to keep young children engaged on school entry.

Kris Kras Atelier for young children and Atelier in een Koffer for adults

**Amsterdam, the Netherlands
With Sabine Plamper**

10,000 scratch drawings are 10,000 brain connections (Anon.)

In Amsterdam I attended several art classes for young children in the art studio downstairs at OBA, the Public Library, on the waterfront. Kris Kras Atelier is run by Sabine Plamper, who I met in January 2019 at the 8th International Art in ECE Conference at Victoria University of Wellington where she invited me to visit her. Sabine is a cultural pedagogue, photographer and a former atelierista in a Reggio Emilia inspired early childhood centre called De Platanen in Amsterdam.

Kris Kras Atelier accepts enrolments for young children for 6 one hour sessions over 6 weeks in a term. On the day I visited there were up to seven children (aged 1.5 to 4 years) in the classes each accompanied by a parent or caregiver. I was initially surprised by the number of male parents until one man explained that he and the child's mother worked four days each and spent the other day at home with the child/ children – one on Monday and the other on Friday. The great family friendly practices in these parents' workplaces are to be applauded.

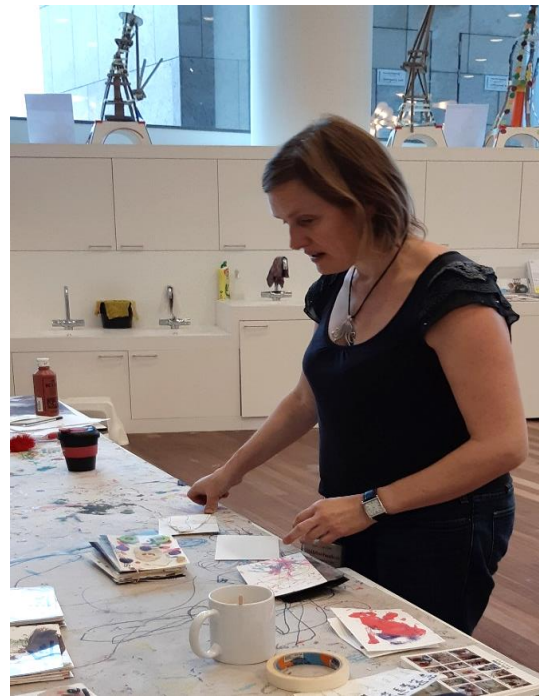
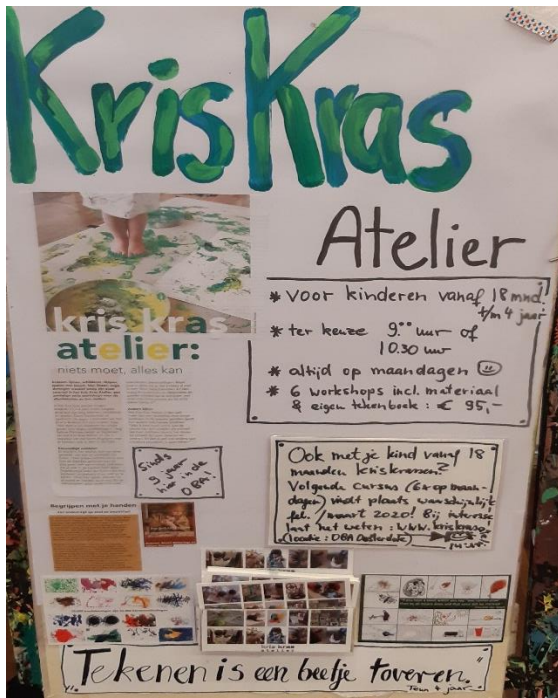


Image: Quote by a 4 year old on this noticeboard says 'Drawing is a little bewitched'.

Image: Sabine bundles up A6 drawings and observations by herself or parents into 'mark books' for every child

Sabine had experiences on offer at three different workstations which children could choose from. The 1st station is always the 'explore drawing' table with small A6 cards, also for painting, cutting and discovering. The 2nd station was sand play in a sewing box with various tools and the 3rd station involved two easels for large format paintings.

During each class whilst children explored the materials with their hands and bodies, Sabine explained (and role-modelled) to parents that they should give their child their full attention without interrupting them. She asked the adults not to judge the children or their work and told them that some mess was OK. She also explained the importance of the process and that mark making mattered. Parents were also asked to make observations on A6 cards about what their children were doing and discovering. Sabine explained that this important task for parents involved them being a witness to the creative process. This task also helped parents to keep more distance from their child and not interrupt or judge them.



Image: Sabine working with a group of toddlers while their parents/ caregivers look on



Image: A parent's documentation for their child

As an observer I also had access to a pen and cards to write/ draw my observations to be included in children's mark books along with their artworks. To me these drawing and hand-written notes were a refreshing change from the types of documentation often seen in ECE settings in our country.



Image: The novel sandbox was the perfect height for toddlers to investigate

Sabine's other work and passion is her certified training institute 'Studio is a suitcase' (Atelier in een Koffer). The suitcase symbolises various possibilities for creativity in daily life using practical tools. This suitcase's mobility means that Sabine or one of her Kris Kras colleagues can set up anywhere – hence the name 'Atelier in een Koffer'.



Image: Atelier in een Koffer

I attended a 'Drawing Play & Sports' workshop that Sabine ran for a group of university students and their lecturer Joke den Haese, who were visiting Amsterdam from Erasmushogeschool in Brussels, Belgium. Ursula Woerner, Sabine's Kris Kras colleague, used the mobile atelier (a much larger suitcase than in the photograph above) at an Early Years conference. She facilitated a workshop I attended called "Help! I can't draw". Meanwhile, Sabine gave a presentation about her book *Understanding with your hands: Another view on children and creativity* to another audience at the conference.

At both drawing workshops I was impressed by the quality of the materials provided for participants from the suitcases. I also realised that working collaboratively was far less stressful and way more creative than what my individual efforts would have been. At "Help! I can't draw" we engaged in a number of collaborative experiences involving drawing and natural collage, drawing and stickers, drawing a Mandala using a limited number of symbols, observational drawing of insects, taking a line for a walk, etcetera under Ursula's direction and timekeeping. Moving quickly from one hands-on experience to the next and using small postcards and shared strips of paper seemed to help reduce the anxiety that many participants described having felt about drawing in the past.

On reflection I think it would be great to run similar workshops for ECE teachers in New Zealand to encourage teachers to draw with and alongside children and to increase their confidence. Watch this space!

For anyone who may be going to Europe in future who is interested in this art in ECE approach, Sabine is running a two day course in English '*Understanding with your hands*' in Amsterdam from 3-5 June 2020 and 2-4 June 2021 (close to place and date of the 9th International Art in ECE Conference 2021 likely to be in Exeter in England) More information and tickets are available at : <https://atelierineenkoffer.nl/product/international-2day/>

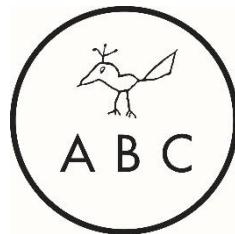
Day trip to Brussels

During my stay in Amsterdam I also had a day trip to Brussels in Belgium with a group of Dutch artists and art educators to visit ABC House of Art Education (see case study that follows). ABC House is a stunning research centre located in Brussels, Belgium. The centre operates on the border of arts and education as a laboratory for aesthetic experiences and awareness. Children and adults of all ages are welcome at the centre which is run by a non-profit organisation and financially supported by the Brussels, Flemish and French governments. A former industrial building (1600m² over 3 floors) has been transformed into an interactive and artistic laboratory in which to work, play and explore. <http://www.abc-web.be/>

ABC Art Basics for Children

Brussels, Belgium

With Wim De Graeve



The day I visited ABC House with a group of artists/ art educators from Amsterdam, we were hosted by Wim De Graeve, the centre's financial director who has worked at ABC House for 20 years. He is part of a team of 7 staff who are joined by large numbers of interns each year from universities and other education institutions around Europe.

ECE and school groups are invited to make an ABC House Lab or Studio their home base for a week or a month or a year, and ABC guides support teachers in their work. Last year a group of 20 children and their teacher from a Steiner school came to work and play every day for the entire year. A group of infants and toddlers and their teachers also visited one day a week over the year to use the gym/movement/dance studio.

“The building is organised along a circuit that links together a theatre pit, several studios, a film studio, a library, a crèche café, a children’s kitchen and offices. Several passages and views around these places enable all sorts of exchanges and relationships to be set up” (p.8). <https://www.bozar.be/file/345/download>. Our group visited a number of stunningly appointed studios that focused on nature, theatre, graphic design, poetry, paper, cooking, architecture and many more subjects, a crèche-café and a cinema auditorium. Outside a vegetable garden and playground surrounded the building.



Image: View from the kitchen inside garden to the outside deck.



Image: Our host Wim pictured with a mobile kamishibai – a story theatre cabinet for showing paper dramas.

This was the second time on my study tour that I had seen kamishibai - a Japanese story theatre tradition (kami = paper, shibai = drama). I was delighted to see numerous picturebooks turned into A3 prints with the text on the back that the narrator reads or tells. With every new episode, the narrator shifts a print from the box, and continues with the next one. A kamishibai story is a bit like a delayed animation film - image and language go together perfectly. To read more about the history of Kamishibai visit <http://www.abc-web.be/abc-kamishibai/>

ABC House makes and sells approximately 50 kamishibai theatres each year to schools and centres, libraries and out-of-school care programmes. They also organise kamishibai stories on request. Cultural centres, schools, libraries or festivals are ideal places for storytellers to perform on a kamishibai bicycle, or in a kamishibai corner or a nomad tent. ABC has more

than 200 narratives for kamishibai storytelling and the collection is constantly growing. They transform existing picture books or give assignments to draftspeople and authors. The range includes Japanese 'traditionals', and stories from contemporary authors / illustrators. All stories can be borrowed for free or copies can be purchased online at the link above.

Accessible to all visitors, the resource library is an amazing collection of inspiring and stimulating books, ideas and materials on art and education. Within the building interactive working stations are equipped with selected books, visuals and specific research materials. Their well-defined settings enable small groups of visitors to explore and investigate at ease and in confidence. ABC support resources provide opportunities to have a different view, and to ask as well as answer questions.



Image: Resources available at ABC House

ABC House also has a range of quality multilingual mobile studios set up in English, Dutch, French and German. The staff including interns work with groups who tailor make projects and creative environments for organisations in the artistic, cultural, educational and social field and for permanent or temporary use. Museums, theatres, cultural centres, schools and ECE centres, libraries, refugee centres, festivals all access ABC House resources and/or mobile studios.

The ABC team are currently searching for strategies to inspire present and future teachers through informal learning experiences, to teach in a more artistic and personal ways. The team is working on a new, interdisciplinary teaching culture in which art is woven into all areas of the curriculum including STEM which they view as lacking an essential element – the Arts hence their advocacy for STEM + ARTS = STEAM.

In their STEAM Studio /Arts and Science Lab there were numerous interactive modules available on astronomy, architecture, mathematics and digital techniques to name a few. The ABC House team is hopeful that their ideas and materials will help teachers to go beyond the traditional transfer of knowledge, and gain new insights through interactive learning.

In many common areas of these different domains, they highlight the creative parallel world between artists and scientists. Intensive research combined with intuitive thinking is just one

example. Through stories they unlock the experimentation and curiosity of great minds like Leonardo da Vinci, Galileo and palaeontologist Mary Anning who made important finds in Jurassic marine fossil beds around sea cliffs of Dorset.

Postscript: Individuals can arrange to visit anytime by phone or email. One day I would be very keen to lead an ECE Arts study tour to ABC House in Brussels for intensive professional development in Art Basics for Children. Let me know if you are interested

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Berlin, Germany – November 2019

In Berlin with my host Sibylle Haas I visited a number of educational museums, centres and classrooms including Labyrinth Kindermuseum (see case study that follows).

Sibylle, an art therapist, freelance lecturer and author (see www.verlagdasnetz.de) is also a former ECE professional development advisor. Having visited Aotearoa New Zealand several times and worked alongside Wendy Lee and Margaret Carr, Sibylle is a Learning Stories advocate and presents about narrative assessment in Germany. We had met at International Art in ECE conferences in Cyprus in 2013 and in Wellington in 2019, and she had invited me to visit.

1, 2, 3, *Kultummel* [Cult hype] at Labyrinth Kindermuseum

Berlin, Germany

With Alkistis Karouli



Labyrinth, a museum for children aged 3-11, is part of Berlin's cultural and educational landscape. At the 1,000 square metre museum housed in a former machine factory, exhibitions are staged that can last up to a year in duration. Open seven days a week, the museum hosts school and ECE groups on weekdays while on weekends lots of family groups visit to explore the range of hands-on exhibits (and spend time in the café).

Each exhibition is produced in cooperation with numerous institutes, companies, artists and scientists who develop an abundance of ideas for interactive exhibitions, projects, workshops, and events. The museum and organisation that runs it is staffed by 50 people including exhibition developers, pedagogues, artists, administration staff and interns. They are supported by many volunteers. The government and a major sponsor fund each exhibition – in the case of 1, 2, 3, *Kultummel* the major sponsor was Lotto.

The interactive exhibition on at the time of my visit was the museum's 24th exhibition, called 1, 2, 3, *Kultummel* - Diversity: Where does it come from, where can it be found, and how do we meet it? The exhibition explored the endless and rich world of diversity, and its key message was that, "diversity is what makes the world so rich and what makes life so worth living. Diversity is an unlimited amount of possibilities, paths, questions and ideas. Every person, every child contributes in its absolute uniqueness to the diversity of the world - and that's a good thing! The interactive exhibition 1, 2, 3, *Kultummel* involves the youngest in society in the current discourse on the value of diversity. Children are encouraged to take on new perspectives, to find creative solutions and to become co-designers, visionaries, practitioners and *diversifiers* of a new diversity"

<https://www.labyrinth-kindermuseum.de/en/content/content-kultummel>.

Alkistis Karouli, an art therapy student from Greece is working part-time at Labyrinth for a year in conjunction with her studies. She described her role as a 'diversity butterfly' – she wears a coloured hood that makes her easily recognisable and she flits around groups of children and exhibits, touching, asking questions, making suggestions and reading stories.

Alkistis stressed how there are few rules at Labyrinth and that experimentation is encouraged by the international team of staff and volunteers. Most team members are non-German so everyone is practising their new language as well as speaking their home language with the ethnically diverse children/ students and families who visit the museum.

When Alkistis (or one of her peers) welcomes a new group of children to the exhibition she gets them to look at their own and each other's hands noting how different they all are and how each person's fingerprints are unique to them. A school/ ECE centre visit often involves children exploring the hands-on exhibits as well as collaborative drawing, storytelling, songs and games adapted to children's needs, drawing on their collective knowledge.



Drawing of herself as a diversify - a diversity butterfly
- Alkistis Karouli

The museum website describes “13 hands-on exhibits, inspired by modern pop-up stores, be it the large world course with the six continents, be it a try-on in the changing room, travelling thoughts in the suitcase shop, an exploration of the languages’ diversity in the book store or be it homey stories at the lamp store. The exhibition aims to engage the youngest of our society in the discussion about the value of diversity and to make them co-designers, visionaries, practitioners and new diversiflies. The 13 creative and interactive stations motivate the children to get to know diversity which can be found in food, languages, clothes, history and stories as well as in countries, regions, colours, words, smells, feelings and of course in the fascinating singularity of every single human being” <https://www.labyrinth-kindermuseum.de/en/content/content-kultummel>.

The interactive exhibits are designed to get children working collaboratively with their peers. Freedom of exploration is encouraged and the play-based learning experiences featured many familiar ECE experiences such as Lego, puppets, dress-ups, books, maps, touch/texture boxes, smell boxes, matching/ guessing games, mirrors, and video screens featuring games and documentaries including a ‘Courage Machine’. Upstairs there were heaps of blocks and pillows and children were encouraged to build huts together. There was also a café and a large outdoor space utilised in the warmer weather for messy arts experiences such as papermaking. The next exhibition *Today, of course! Participate for tomorrow* focuses on protecting the environment and the planet.



Image: A range of different ethnic dress ups are available to the children



Image: Children use digital drawing programmes to express their ideas about diversity



Image: Children are encouraged to work collaboratively to build huts with blocks, blankets and pillows



Image: Different socks represent ideas about difference and diversity

On reflection this exhibition might inspire teachers in this country to think about how children can be supported and encouraged to relate to diverse others through collaborative arts projects. It might also make you think about sensitively incorporating artefacts, symbols and arts from the cultural backgrounds of children in your setting.

Sibylle and I also visited *Ina Kindergarten Dresdener Strasse* – a large kindergarten that catered for 150 children aged 0-6 years. They are one of a number of kindergartens under the same umbrella that operate across Berlin and beyond. I was fascinated by the space which I was told was a ‘park house’. It turned out that in 1986 as part of an international building exhibition, which dealt with careful urban renewal, an unused parking garage was turned into a spacious and light-flooded building which offered children and teachers plenty of space. The kindergarten was equipped with a roof garden, a central glass house, a gym and large indoor and outdoor play areas.



The older children had been investigating a range of art media, music and technology for several weeks. They had prepared a special exhibition for their families called *To see and to*

hear: Understanding media and technique. Here was more evidence of young children engaging in STEAM (although they did not call it that).

While in Berlin Sibylle and I also visited Kinder Künste Zentrum where I purchased a number of resources from previous exhibitions published by the Exhibition centre for Professional Development and inspiration for students and teachers (see case study that follows).

Shapes, colours and actions: On the trail of the Bauhaus arts

Kinder Künste Zentrum – Berlin
With Lioba Hagedorn



ECE centre directors, scientists, cultural education specialists and cultural policy makers together with the non-profit Association ‘Learn with all your senses’ have developed the concept for early childhood cultural education that operates throughout Berlin including Kinder Künste Zentrum - Children’s Arts Centre.

The Children's Arts Centre sees itself as a driving force for:

- city-wide innovative early childhood education
- the practice-oriented qualification of artists and educators
- the development of new forms of parenting
- public presentations in interactive exhibitions and mini festivals
- the establishment of a network of early childhood cultural education in Berlin

Housed in a former Public Library covered by a preservation order, the historic building has been converted into a large exhibition room and several smaller rooms for art workshops and offices. The garden with its covered walkway and fountain also offers ideal space for creativity.



Copyright Image Kinder Künste Zentrum: The Children's Art Centre building and garden

Workshops and projects led by artists including sculptors and set designers are offered during the week aimed at ECE centres and schools (for children aged two to ten years). Children can spend between 1-3 days working at the arts centre with visiting artists. The arts centre is also staffed by interns such as Lioba Hagedorn who is currently studying Culture Media Pedagogy at Merseburg University of Applied Sciences in Merseburg, Germany. You can watch Lioba's short video of the exhibition *Shapes, colours and actions* [*Formen, farben and aktionen!*] on YouTube

https://www.youtube.com/watch?time_continue=21&v=qT2hXGOF66I&feature=emb_logo

The workshops are 'growing exhibitions' with everything that children create at the arts centre becoming part of the exhibition. Children can pick up their artworks when the exhibition is over. Exhibitions are often accompanied by artistic hands-on activities for the whole family on Family Sundays when all Berlin children and their families are invited to participate.

This year Berlin has been celebrating the 100th anniversary of the founding of Bauhaus (1919-1933), a revolutionary school/ university of design where artists and students designed an extraordinary number of different things - houses, fabrics, costumes, dishes, furniture and much more. A short video about the exhibition at the Berlin Gallery that Sibylle and I visited the previous day can be seen at

https://www.youtube.com/watch?time_continue=1&v=CIUmlgGYi7E&feature=emb_logo



Copyright Image Kinder Künste Zentrum: Reception area with Bauhaus books on display

Meanwhile, ECE and school students have been exploring line, shape and colour in artistic workshops at Kinder Künste Zentrum - Children's Art Centre. They have also been designing small 'master houses', knitting mini carpets and designing dishes, as well as building cone hats and unusual masks.



Copyright Image Kinder Künste Zentrum: An exhibition of the children's Bauhaus inspired artworks

Other exhibitions have included: Our city Berlin; Clouds, forest and animals – colours in nature; My body: a creative journey of discovery; Sculpture: Art from light and shadow; and Children's Art Mobile - a project with young refugee children and their families from six Berlin emergency shelters. A range of stunning publications are available that document these projects showing the possibilities of pedagogical documentation.



Copyright Image Kinder Künste Zentrum: Children's artworks on display in the large exhibition room

Learning Workshop - Lernwerkstatt der Zurich Schule

Sibylle Haas, my host and I also visited a Learning Workshop at Lernwerkstatt der Zurich Schule - a school in Berlin where we were welcomed by Tina Haber, an artist/inventor/pedagogue and her assistant Lisa Posselt.

<https://www.zuerich-schule-berlin.de/index.php/schulgemeinschaft/lernwerkstatt>



Image: Inside the Atelier

Associated with the school, the Learning Workshop is a beautifully equipped space for inquiry learning set in large gardens conveniently located just around the corner. The Learning Workshop has five dedicated learning focus areas - Arts and handcrafts, Elements and energy, Beings, Early Mathematics and Early Literacy. Students who visit here for 5 half-days in a row engage in projects which involve all of these areas – hence my STEEAM interest. The projects are closely related to the Discovery cycle loosely translated as: Hypothesis, Experiment, Close Exploration, Documentation, Results, and New Question.



Image: The Discovery Cycle in German

Groups of 12-15 students aged 6-12 years old attend for a morning programme accompanied by a teacher or teacher aide. Teachers from four ECE centres are also involved in Project work/ Professional Development at the Learning Workshop where the team also develop Project support materials for all six school classes in conjunction with classroom teachers. During their Project week students conduct open-ended research on subject-related topics. The Learning Workshop team ensures suitable spatial conditions and a selection of materials that enable students to experience new things again and again. Supported by the learning guides and the exchange in the group, the students find their own questions. Documenting their learning path in diaries or artistic works is an integral part of students' project work.

The day we visited the Learning Workshop, the group working there was made up of 7-8 year olds students from the school's 'welcome class for 'new arrivals' to the country who are non-German speaking. The students were working in culturally and linguistically diverse groups with an adult on a project about getting to know themselves and other non-human beings. Their investigations were provoked by questions such as: Where do you live? What do you like to eat? What is special about you? Who is your friend? The students came together in a circle to discuss themselves and other beings, then worked collaboratively in small groups using the Visual Arts medium of shadow puppets to represent their ideas about animals and their habitats. At the end of each Project week, students who have been working on a Project at the Learning Workshop present their work, and these students were looking forward to their parents and families coming to see their Projects.

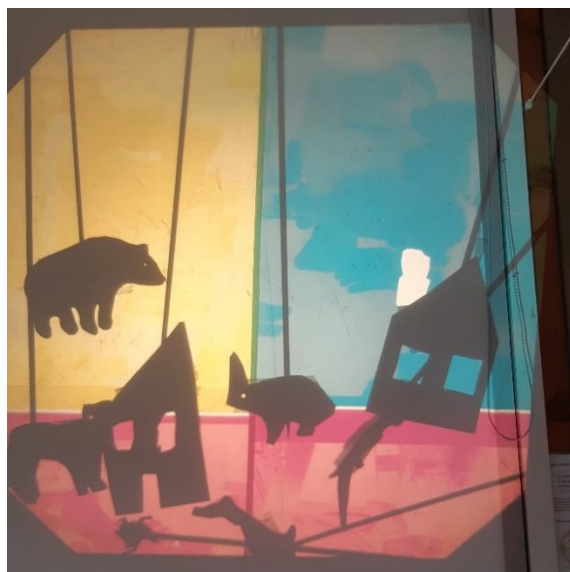


Image: Shadow puppets of animal beings and their habitats

From an Aotearoa New Zealand perspective, I was fascinated to see the integration of STEAM discipline areas in this 'Beings' Project involving Shadow puppets (Exploration) supporting students' social learning (Contribution), German language learning (Communication) and group identity (Belonging and Wellbeing). Imagine what it would be like in this country if students/children in every school and the neighbouring ECE centres had access to a Learning Workshop with high quality resources dedicated to Inquiry/ Discovery integrated learning in STEAM disciplines. Problem solving, creativity and initiative, highly desirable 21st century skills would be fostered in fabulous ways like they are at Lernwerkstatt der Zurich Schule in Berlin.

Saint Sulpice, Switzerland – November 2019

In Switzerland I visited Lécoline in Saint Sulpice, Switzerland's first (pre)school inspired by the Reggio Emilia education project. There were also strong echoes of the Forest Schools movement as the school was situated in a multi-storey building adjacent to a bush reserve with Lake Geneva at the bottom of the no-exit street. Every day, regardless of the weather, the children from both parts of the school go outside and experience the nature community just beyond the building doors. The atelier for 4-6 years olds was on the first floor and the atelier for 2-4 year olds was on the ground floor). (See case study that follows).

A novel experience for me was spending time in the Coworking space at Lécoline with several parents who chose to spend their working day on-site, with their children nearby, in a fit-for-purpose workspace with desks, Wi-Fi, sofas, and a mini-kitchen. One woman described coworking there as a great alternative to spending time on the road between dropping off and collecting her two children while another said she enjoyed the company as opposed to working from home all the time.



Image: Coworking Switzerland Manifesto on the wall at Lécoline

When Art meets Science

Lécoline, Saint Sulpice, Switzerland

With Elizabeth Biondo



As I entered the 4-6 year old atelier at Lécoline, Saint Sulpice, I immediately saw and recognised the quote by Loris Malaguzzi the founder of the Reggio Emilia education project prominently displayed on the wall.

Children need the freedom to appreciate the infinite resources of their hands, their eyes and their ears, the resources of forms, materials, sounds and colours.

The ateliers (and the quote) spoke to me of pedagogy based on inquiry/discovery learning, of integrated curriculum, projects and documentation, and the environment as the third teacher. Like many places I had previously visited in Europe, I could see that many aesthetic decisions had been made in setting up the environment, and organising the extensive high-quality teaching and learning resources for children's ease of access. The environment felt welcoming and homelike for children, families and teachers, as well as international visitors like myself. Children's social engagement with others was facilitated and experiencing their relaxed, unhurried three-course-lunch hour long lunch was amazing.



Copyright Image: Website photograph of children from Lécoline painting on the foreshore of Lake Geneva



Image: A child's drawing/collage of themselves on a rainbow in the sky

When several children announced that they wanted to stage a performance about the planets, an audience of children and adults gathered in a quiet room with lots of seating. On request, Elizabeth immediately found a suitable music soundtrack on her phone, and the group danced and told stories delighting us all with their impromptu and seemingly unrehearsed performance.

This whole experience reminded me of the power of ongoing projects. When sustained investigations of phenomena combining different disciplines or domains (Arts and Physics for example) take place and are documented, the co-constructed understandings of children and adults are made visible for the community to behold.

Melbourne and Perth, Australia – November/December 2019

In Melbourne and Perth I spent a week each at Monash and Edith Cowan Universities. Both *Visiting Academic* appointments were connected with academic staff and/or projects who/that drew my attention because of their relevance to my Study Tour topic about STEEAM.

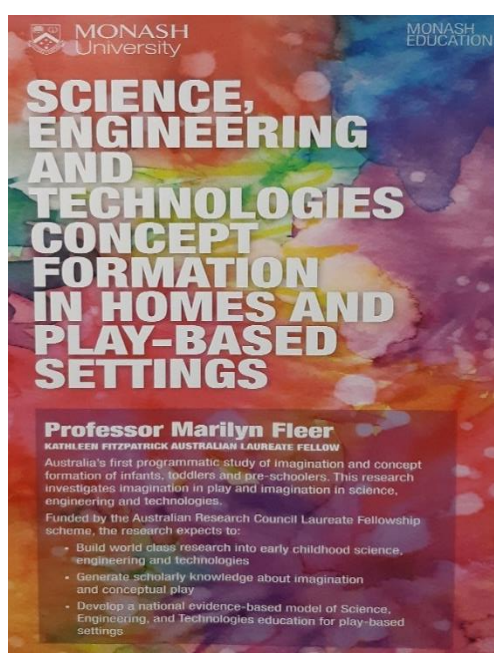
Like elsewhere, my time with academics at Edith Cowan University in Perth was very fruitful. I discussed research projects and accessed STEM resources and articles with/by Pauline Roberts and Marianne Knaus (Knaus & Roberts, 2017; Roberts & Knaus, 2018). Our proposed kindergarten [research site] visit turned out to be not possible as they had closed the previous week for the holidays. I also spent time with Helen Adams discussing possible collaboration in future based on our shared research interest in picturebooks about diversity. Professor Mindy Blaise, another ECE academic at Edith Cowan University has an alternative philosophical and theoretical approach in her research with young children in STEEAM domains. However she was unavailable to meet face-to-face but I have accessed her publications and the 'Common Worlds' Research Collective website she set up, <https://commonworlds.net/> and am keen to follow up this approach in my future research

The Conceptual PlayLab at Monash was also very enlightening in terms of the PlayWorld research project and its links to STEM concepts. The Blog I wrote for Waikato Picturebook Research Unit (WaiPRU) is reproduced below:

<https://education.waikato.ac.nz/waipru/conceptual-playworld/>

WaiPRU BLOG

Picturebooks are a central feature in the Conceptual PlayWorld model launched in March this year as part of a larger five-year programme of research called the *Conceptual PlayLab* (2019 - 2024) at Monash University, Peninsula Campus in Victoria, Australia. The Conceptual PlayWorld is a model of intentional teaching that Monash Professor Marilyn Fleer developed based on extensive research and experience working with young children and how they form concepts in science, technology, engineering and mathematics.



A Conceptual PlayWorld is an imaginary scenario created by an educator where young children are invited to go on imaginary journeys, meet and solve challenges, and learn STEM concepts – all while playing. A Conceptual PlayWorld can be inspired by a children's book or a fairy tale story, and it can be setup in an average classroom. Imagination is the limit!

This imaginary world enables educators to deliver play-based programs for young children where they get to experience and live through concepts that would otherwise be difficult to explain. PlayWorlds might last for a week, a month or even a term whereas Pop-up PlayWorlds may last only for a morning.

There are five steps for creating a Conceptual PlayWorld and encouraging a love of STEM.

Step One: Selecting a story

Educators are encouraged to start with a simple story such as *Rosie's walk* (Hutchins, 1967), incorporate drama and learn about something like 'prepositional language' (on, over, under, behind, in front, etc.) and of course PLAY these concepts with children in your imaginary Rosie's farm

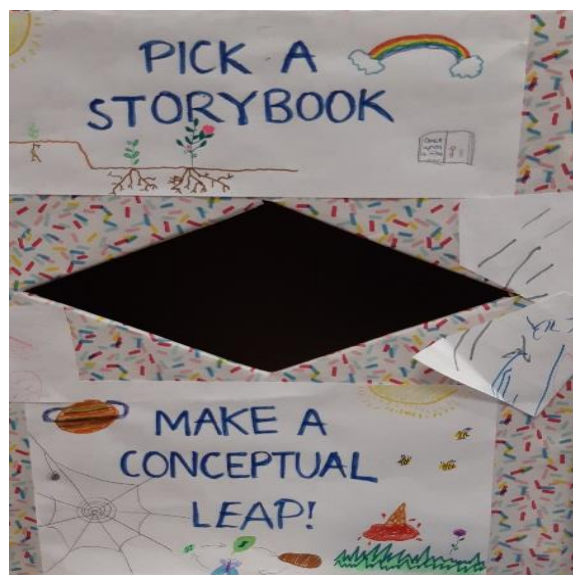


Image: Picturebooks available in a receptacle for teachers to select from at the Conceptual PlayLab

Some books used in schools and ECE settings to date include *Rosie's Walk* (Pat Hutchins, 1967), *Charlotte's Web* (E.B. White, 1952), *The Secret Garden* (Frances Hodgson Burnett, 1911).

Step Two: Designing the imaginary spaces

Step Three: Entering and exiting the PlayWorld

Step Four: Planning your problem to be solved

Step Five: Deciding what role you, as the teacher, will take in the PlayWorld

There is a downloadable App and a private Facebook page to support educators who want to be involved. For more information check out: <https://www.monash.edu/conceptual-playworld/about>.

On reflection, I wonder what other Picturebooks might work as starters for Conceptual PlayWorlds. Remember they need to have a problem that needs to be solved - *There's a hippopotamus on our roof eating cake* (Edwards, 1980) or a *Possum in the house* (Jensen, 1986); some emotional tension - Rosie the hen doesn't know that the fox is following her; characters that children and teachers can be assigned in the PlayWorld, and possibly other characters that could be added to be part of the drama; and concepts related to STEM such as food security, spatial awareness or problem solving for example. The possibility of maybe doing something associated with the Monash Conceptual PlayLab in Aotearoa New Zealand in the future is very exciting.

Postscript: I was interested to know why the Arts were not explicitly mentioned in the Conceptual PlayWorlds project particularly given that the model is based on 'process drama'. Video footage showed that once children and teachers have exited the PlayWorld (Step three) that children's explorations often focus on them mapping or drawing diagrams of the environment, and/or the problem to be solved. From discussion, it seems that for strategic reasons (funding/ politics maybe) the Arts will be added in to the model once it gets underway.

NOTE: In Australia there is a Government Minister with responsibility for STEM education, a National STEM School Education Strategy (2016 - 2026), and a big push to get more women and girls involved in science.

Visits to Heide Museum of Modern Art and National Gallery of Victoria

While in Melbourne I also visited *Heide Museum of Modern Art* and met with Public Programmes and Education Managers Bernadette and Tara. <https://www.heide.com.au/>. The exhibitions represented STEEAM to me in a myriad of ways as artists combined arts, technology including digital technology with engineering, the environment, science and mathematics. Creativity and problem solving were ever present in the 'Meccano' caravan, sculptures made of recycled metals, quilts and costumes inspired by science fiction, and virtual reality through 3D glasses. I was interested to watch a school group explore the exhibitions (eyes only - hands behind their backs) except when they were outside where I overheard the teacher say "I spy with my art looking eye a sculpture that is doing this..." It reminded me of the image of children physically interpreting a sculpture at TSB Bank Wallace Arts Centre in Auckland described in ecARTnz https://www.elp.co.nz/files/ecartnz_issue_4.pdf

I also visited the *National Gallery of Victoria* where I paid special attention to the activities 'For kids' found on the walls in many exhibitions. Many of these related to inquiry/discovery learning and focussed on social and cultural issue related to indigenous Australia life and art as well as environmental issues - more examples of integrated disciplines to support children's 'working theories' about people, places and things.

Inclement weather and a heatwave precluded me from visiting the *Ian Potter Foundation Children's Garden* as I had intended.

<https://www.rbg.vic.gov.au/visit-melbourne/attractions/children-garden>. Instead I read Karen Malone's article <http://dx.doi.org/10.1017/S0814062600002202> that features this garden in her discussion about 'Creating Spaces to Support Children's Environmental Learning in the 21st Century' and resolved to visit the garden on my next trip.

CONCLUDING REMARKS

On my Study Tour, I was a 'participant observer' in the ECE settings, libraries, workshops and galleries that I visited. I observed toddlers and young children (18 months - 8 years), teachers, artists, art educators, and academics and researchers. Without exception, in every place I visited where there were young children present (or young children were expected to visit) there were opportunities for hands-on, interactive inquiry/discovery learning in two or more STEM/ STEEAM discipline/subject areas.

I saw many examples of play-based, experiential learning, integrated curriculum, and plenty of provocations for in-depth learning. The emphasis was always on discovery - looking and seeing, problem solving, imagination and creativity; the fundamental aspects of STEAM + Arts. Aesthetic modes of expression were also ever present especially drawing, painting and imaginative play. High quality pedagogical resources particularly fiction and non-fiction reference books / picturebooks were available, and storytelling was common, involving

puppets and screens - Overhead projectors (OHPs) or Kamishibai (story theatre) in several places.

With the exception of my colleague in Umeå in Sweden no one spoke specifically about 'working theories' but everyone talked about the importance of young children developing knowledge, attitudes and dispositions about STEAM, and the importance of problem solving, creativity and innovative thinking now and in the future. Publications about young children's 'working theories' in relation to STEAM and sharing the recorded interviews between Sofie and I will support others here and internationally to utilise this construct just as Sofie has with Swedish ECE teachers.

In the ECE and other settings I visited, people often talked about being influenced by the *Reggio Emilia Education Project* (Edwards, Gandini & Foreman, 1993, 1998, 2011) while others talked about 'inquiry based learning' and 'discovery learning' (Dewey, n.d.; Bruner, 1961, 2009). I was conscious that I was also seeing the *Project Approach* (Katz & Chard, 1989, 2000, 2014) being enacted.

Ideally, I would like to have spent more time working alongside teachers with young children in early childhood settings. However, such settings are necessarily cautious regarding bringing unfamiliar people into their space. I had not fully anticipated the extent to which my contact with children would be limited. In terms of documenting what I was seeing, in many places I was only permitted to photograph children's hands rather than their heads or faces.

Nevertheless, the opportunity to work alongside, and dialogue at length with artists/inventors, teachers/ educators and academics/researchers has greatly stimulated my imagination as well as increasing my knowledge base. I am buzzing with all that I have seen and photographed as well as the many publications that I brought home. I saw much innovative practice that I am eager to share in this country in order to enhance the pedagogical possibilities available to teachers, children and their families in the STEAM space. I also observed much that was similar to what I see in ECE settings and other places that children frequent in Aotearoa New Zealand. This showed that past and current European ECE traditions have influenced us too, and that they are alive and well 'down under'.

Whilst websites are able to provide a good deal of information about the history and philosophy and education programmes that ECE centres, schools, museums, public spaces offer/ provide, visiting and absorbing them hands-on and through my senses was fundamental to my learning and thinking.

The two biggest education issues I observed in Europe and Australia related to: sustainability, climate change and preserving, and learning in, natural environments (aka LINE); and social cohesion of culturally and linguistically diverse people. Educational pedagogy was almost always focussed on the natural and social worlds with diversity, inclusion, social cohesion, and sustainability as core foci. Hence my keen desire to see another E in STEAM so that Environmental Education can be included alongside Engineering.

This was my first extended trip to Europe. The plethora of men teaching in ECE, the family-friendly policies like parents with young children working four days a week, ‘coworking’ opportunities, and an abundance of child-friendly public spaces were enlightening to see first-hand. The ‘Coworking’ space at Lécoline was awesome as part of Coworking Switzerland. I also saw a coworking sign on a shopfront in Hastings, Victoria. Seeing EU nationals freely travelling with their cat, dog or ferret who all had European pet passports was also intriguing.

I relished the chance to see/experience a number of different historical, social, political, educational and cultural contexts within Europe, Asia and Australia, and to explore opposites and parallels with Aotearoa New Zealand. Being monolingual was a hindrance but luckily for me most Europeans were multilingual and willing to translate for me during conversations and with written material.

RECOMMENDATIONS

That the Ministry of Education provide professional development and fund the publication of electronic (online) and hard copy resources, for teachers about STEEAM in ECE.

That research is undertaken with teachers, infants, toddlers and young children, and families in ECE settings in Aotearoa New Zealand about STEEAM from traditional constructivist and alternative posthumanist perspectives, and that research findings be accessible for ECE teachers in order that there are relevant readings available to support pedagogy in this domain in Aotearoa New Zealand.

That where practicable, ECE centres be encouraged to consider providing ‘coworking’ spaces for parents of young children so they can work from the centre rather than spending time in traffic getting to and from their workplaces/homes.

HOW I WILL SHARE MY NEW KNOWLEDGE WITH THE PROFESSION - PUBLICATIONS

- The Fellowship Report will be available via the NZCER and Early Years Research Centre websites, and my profile page at The University of Waikato (if deemed appropriate by the Trustees)
- A special issue of *ecARTnz* that profiles people and projects from my travels has been created and is currently in-press. Articles have been written in conjunction with people I visited on my Study Tour
- An article is in progress for a journal available to practitioners and academics in this country and beyond – possibly *Early Education* and/or *Teachers and Curriculum*.
- Two blogs have been written for the Waikato Picturebook Resource Unit (WaiPRU) website
 - Conceptual PlayWorlds - December 12 2019
<https://education.waikato.ac.nz/waipru/category/blog/>

- Storytelling the Kamishibai way - March 2020
<https://education.waikato.ac.nz/waipru/storytelling-the-kamishibai-way/>

PRESENTATIONS

- Presentation to Monash Conceptual PlayWorlds Lab staff and PhD students – ‘Study Tour highlights from Europe’ - 2 December 2019.
- I have arranged to present to the local OMEP chapter in Otago on 16 March during my appointment as a Visiting Academic at the University of Otago (2-20 March 2020). I am also arranging to present to a combined forum including the local chapters and branches of OMEP / REANZ/ NZEI in the Waikato Bay of Plenty once my Research and Study Leave ends on 20 April 2020.
- I am planning to present a seminar at the annual Early Years Research Centre conference for teachers/ student teachers at The University of Waikato (generally held in July - date yet to be confirmed for 2020)
- I am actively seeking invitations to give keynote addresses and/or workshop presentations at Kindergarten and other ECE conferences.

RESEARCH, PROPOSED RESOURCE AND INTERVIEWS

- I am currently preparing a funding application for a STEEAM based research project in conjunction with research staff at the Wilf Malcolm Institute for Educational Research (WMIER) at the Faculty of Education, The University of Waikato.
- I have begun working on a proposed resource that could be made available electronically to early childhood education [ECE]/ early years teachers/ student teachers to support them to *explicitly* explore STEEAM concepts with young children. I am developing the resource using verbs following the example of Areljung (2016) in science, the NZ Ministry of Education (2010) in mathematics, and OMEP (2010) in sustainability.
- I recorded a new interview between Dr Sofie Areljung and myself talking about our respective work related to ‘working theories’ and pedagogy while I was in Sweden. This is our 2nd interview, the first was recorded in 2015 when Sofie was in New Zealand on Study Leave. Both interviews are available for students, academics and others who are interested to access them
<https://www.youtube.com/watch?v=wp57Rhr-2Kc&feature=youtu.be>
https://drive.google.com/file/d/1NrWZ1T_E6EpKHh_JzNib0VxXm5uYbG8y/view

SUGGESTED READINGS ABOUT STEM/ STEAM

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