

ASTEN Professional Development Fellowship

Scitech, Perth

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Fellowship Report by Anna-Sophie Winter, Assistant Manager, The National Science-Technology Roadshow Trust

Introduction

Touring and performing full-time on an interactive science show is a way of life at the Science Roadshow in New Zealand. For me, visiting Scitech in Perth was an excellent opportunity to observe the effective management of another large-scale science venture. Throughout the week, I had the pleasure of meeting with a range of Scitech staff to gain an insight into their daily operations, from the creative teams collaborating in the workshop, to the designers and volunteers of the exhibition halls, to travelling with presenters and experiencing their various outreach programs.

For this visit, I placed emphasis on exploring the diverse possibilities of fully immersive exhibits, and on how science communicators can cater to the needs of minority groups, both for those with disabilities and for the integration of ethnic minorities. Additionally, I investigated the processes of getting a concept from the workshop to the target audience, particularly when transforming exhibition material into a travelling format.

Scitech uses a range of avenues to reach many audiences throughout Western Australia, and has a well-established reputation in delivering science in its most inspiring and current form.

Immersion Exhibits

Interactive science exhibits offer a wide range of exciting experiences, the more immersive the better. Be it by lifting users off the ground, engulfing them in a strong gust of wind, or lying down on a bed of nails, it is these exhibits which leave the greatest impression and linger in a person's memory.

Scitech's exhibitions were a showcase of wider possibilities for enhancing the visitor experience through total immersion, using the latest technology, coupled with some of the most talented teams of workshop staff Australasia has to offer. The standard for producing world-class exhibitions was evident in the BHP Billiton Exhibition Gallery, where the latest exhibition "Bionic Me" was on display prior to being dispatched for touring overseas. Visitors crawled through the "Tunnel of Darkness" to explore how much infrared technology can reveal in night-vision, they camouflaged with technology using the "Green Screen," or activated sensors to sprint against a Paralympian - all highly effective immersion techniques. Other immersion exhibits in the science centre included the 360° camera, which involved 52 Raspberry Pis to create dramatic, three-dimensional, fully-rotatable photomontages.

A common aspect to the modern exhibits with immersive qualities was how they involved the user physically in conjunction with technological enhancements. The use of technology was not

mandatory, since traditional immersive exhibits such as the “Chain Hoist” and “Rotating Chair” at the Science Roadshow worked purely on the laws of physics. However, the incorporation of technology widens the immersive capabilities of exhibits and ensures their present day relevance.

Inclusion of All Abilities

Creating an attractive exhibition is a challenge in itself. However, additional considerations must be made to provide disabled visitors an equally rich experience. The first time the Science Roadshow (NZ) was visited by a blind student, the importance of exhibits which utilised sound, touch or smell became apparent. Similarly, classes with students that were hearing impaired brought a sign language interpreter to translate our performances, which gave another perspective on how to include all students in the experience.

It was with these personal experiences in mind that the Scitech exhibition “Bionic Me” was investigated. All 23 exhibits focussed on technology that allowed humans to overcome difficulties and enhance their lives. Exhibits which allowed the user to be hands-free included “Mind and Machine,” which controlled the movement of a ball by detecting electrodermal activity. Another exhibit used voice control to activate appliances in a model house while a third featured a specialised camera detecting the movement of the user’s eyes to answer a questionnaire. A more tactile approach was used in the “Explore Your World” exhibition hall, with one exhibit requiring users to run their hands along either side of a net to experience the illusion of a texture change, whereas another exhibit, the “Air Cannon,” could direct a specific invisible air movement. The exhibits I encountered at Scitech demonstrated a considered design and adoption of technology which allowed people of varied ableness to access and learn about science.

Ethnic Minority Groups

In New Zealand, there is an emphasis placed on integrating Māori culture into the primary and high school curriculum. It is expected for the average New Zealander to be familiar with basic Māori words, and increasingly the Ministry of Education requires the curriculum to integrate Māori language into teaching in conjunction with English, such that both of the official languages of New Zealand are incorporated into the education of its citizens.

The Science Roadshow has embraced this goal, and uses Māori interchangeably in live shows. In addition, the Science Roadshow features exhibits on tour that explore the science behind aspects of Māori culture. An example of this is an exhibit investigating how a hangi (a traditional method of Māori cooking) works, and respects Māori customs by using the appropriate greetings and farewells when welcoming audiences.

Scitech, similarly, aims to inspire and engage Western Australians, a diverse and multi ethnic population and it was of interest to compare and contrast New Zealand’s incorporation of Māori culture to that of Aboriginal culture in the Australian curriculum.

While exploring this, it quickly became clear that one of the biggest challenges facing the integration of Aboriginal culture within the Australian curriculum is the diversity of Aboriginal languages. While Māori has some regional peculiarities and dialect, it is recognisable as a single and uniform language throughout the country, which makes it easier to integrate the language

into day-to-day teaching. By contrast there are approximately 120 Aboriginal languages throughout Australia (see Figure 1).

In addition to language diversity, the oral tradition and lack of a uniform written language provides a challenge. Aboriginal communities traditionally pass knowledge from generation to generation through storytelling and demonstration, instead of written records. While traditionally this was the case with Māori culture, an adoption of English written characters following the European colonisation of New Zealand has resulted in a standardised method of writing in Māori.

An excursion with the Scitech multi-tiered Aboriginal Education Program (AEP) was a valuable experience to see the difference in learning style first-hand, and how a science program can be moulded to adapt to these challenges, successfully sparking interest.

For this excursion, I travelled with Angharad Thomas to visit Moorditj Noongar Community College, where we explored plant growth and seed dispersal, as well as the human life-cycle with two classes aged between 5 and 10 years old. The teaching approach involved comparing live bean plants grown in a fair experiment in sunlight versus in the dark, both visually and with a digital microscope, discussion of seed dispersal and creating paper helicopters to actively observe the power of wind currents. Following this, connections were drawn between plants and humans and how they both age and change throughout their lives. The students were highly enthusiastic and engaged fully with the tasks, and the teachers expanded on these ideas with related activities after we finished our sessions.

All teaching was done in English, but given that there are so many Aboriginal languages across the continent, integrating Australia's nationalities would possibly require a more regional approach.

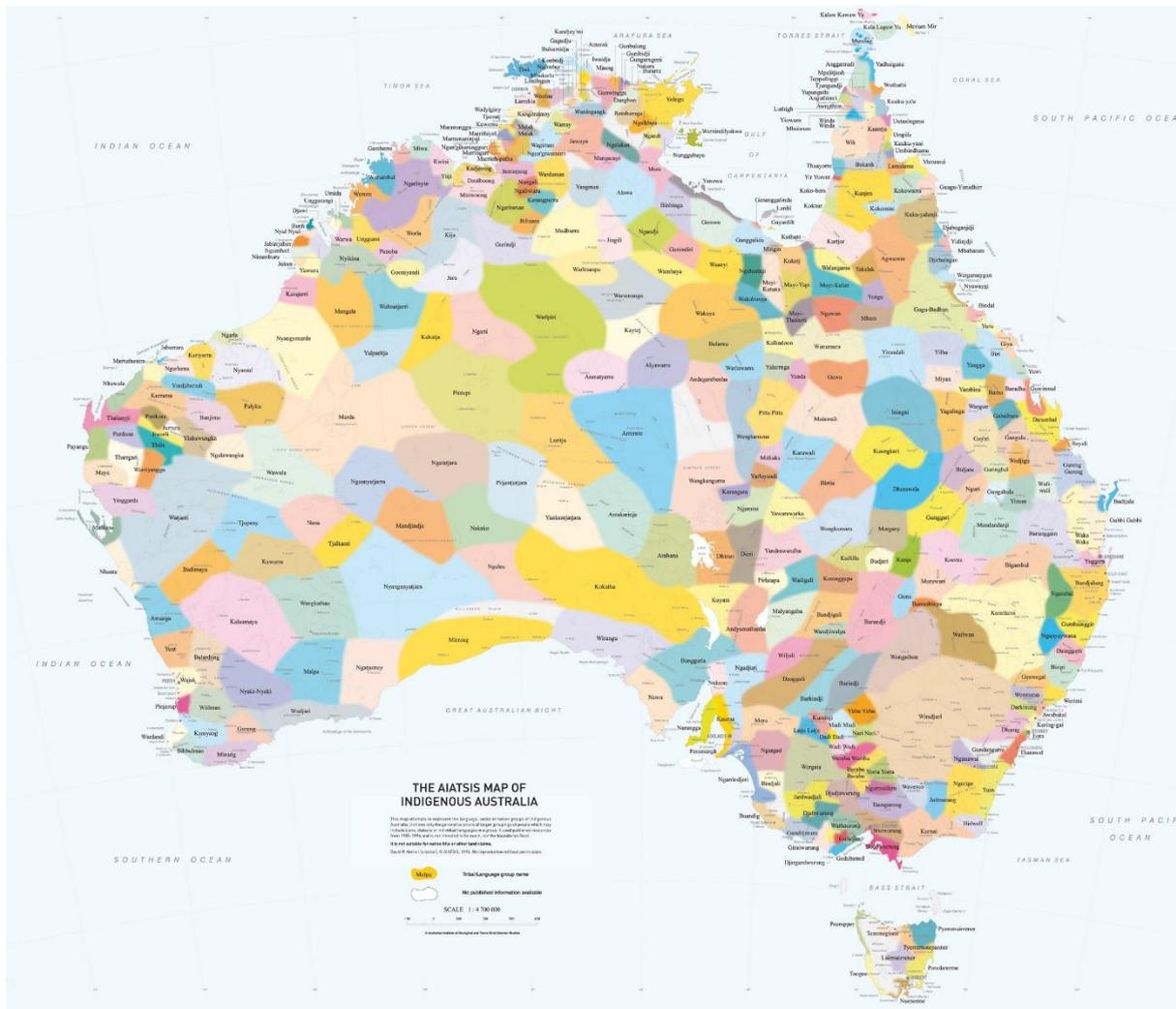


Figure 1: *AIATSIS map of Indigenous Australia*. This map attempts to represent the language, social or nation groups of Aboriginal Australia. It shows only the general locations of larger groupings of people which may include clans, dialects or individual languages in a group. It used published resources from 1988-1994 and is not intended to be exact, nor the boundaries fixed. It is not suitable for native title or other land claims. David R Horton (creator), © Aboriginal Studies Press, AIATSIS, 1996. No reproduction without permission. To purchase a print version visit: www.aiatsis.ashop.com.au/

From Workshop to Exhibition, and the Travelling Format

Developing a mobile science discovery centre like the Science Roadshow has very different constraints and considerations to that of a permanent establishment like Scitech’s science centre. It was nevertheless interesting to compare how each entity develops their exhibits, and considers the potential for mobility.

One third of the exhibits on display were very similar those in the Science Roadshow collection. The difference between the two is the scale, the fixed space that Scitech’s science centre offers enables large-scale exhibits with greater scope to demonstrate science concepts, while the Science Roadshow versions are scaled to collectively fit into a 15m truck and trailer. Exhibits selected for touring exhibitions at Scitech had features that enabled them to be compressed into two 12m shipping containers. All equipment needed to be robust, to withstand Workshop Manager Paul Wilcox’s definition of an extreme push, pull or twist

exerted on it by merciless visitor use, and was made from the highest quality materials to remain immaculate while on tour.

Exhibits at the Science Roadshow need to be equally robust, but they also need to relocate on an almost daily basis, adding an extra challenge to equipment stress and design. Scitech exhibits displayed information at three levels, as described by Rachael Hughs (Exhibitions Coordinator). Visitors process the exhibit information presented to them as either a Streaker, who gains the vital messages at a glance, as a Stroller, who take in more detail at a steadier pace, or as a Studier, those who take their time to look into the deeper layers of knowledge. Graphic design ensured the key messages were relatable for each audience. Not only that, another level of inclusiveness was added to displays through the use of additional external screens, particularly on Scitech's modern immersion exhibits. Even if only a single person could use an exhibit at any given time, the screens were an elegant way to allow spectators to watch what the exhibit user was experiencing.

Conclusion

Visiting Scitech in Perth was truly an enriching experience. Coming from the Science Roadshow in New Zealand, it was of interest to compare and contrast the transformation of an outreach program from its conceptualisation to the final exhibition, and how constraints, foci and goals affected what was achievable.

As a major goal of my visit was to investigate how exhibits could be inclusive of visitors with limited physical ability, it was fortuitous that my visit coincided with the display of Bionic Me. This exhibition included an abundance of exhibits that explored how to break free from the physical limitations of the human body. Both Bionic Me and further exhibits interspersed throughout the Science Centre incorporated the use of all the human senses, which illustrated possibilities for full-body immersion exhibits as well as the inclusion of people who were differently able.

Scitech has also successfully integrated activities across the organisation to reach younger demographics, both at the Science Centre and State-Wide programs, delivering meaningful youth STEM engagement programs. As with all interactive science exhibitions, it is an ongoing evolution of enhancing the visitor experience.

My other goal for investigation was that of the inclusion of different cultures. During my visit it became clear to me how difficult it is to cater for ethnic minorities in multicultural Australia. While the outreach programs could adopt the orating and performance traditions of Aboriginal peoples while minimising written language, the sheer diversity of spoken language regionally meant that these programs needed to be delivered in English, leaving localised translations to the teachers within each region.

With such a collection of talented and passionate individuals, the teams at Scitech have left a lasting impression, leaving me inspired by the sophistication of exhibits, the entertaining delivery of various programs and providing the best possible visitor experience for all, be they in the minority or the majority.

Acknowledgements

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My gratitude goes to Rodney Thiele and his family for their hospitality and extra assistance navigating Perth, it was a meaningful trip, and it will always hold special significance.

Last but not least, a big thank you to my own family Hawi and Susann Winter and Nathan Camp, for their on-going encouragement and assistance in broadening my horizons.

I definitely explored my world through wonder that week.

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