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Planting the Seeds of Science and Technology Within a Maori Community

Dr Mark Laws, Laboratory Director, Auckland University of Technology, maaka@aut.ac.nz

Abstract

The New Zealand Science and Technology Promotion Fund supports creative and innovative activities that help promote positive attitudes towards science and technology. It has a particular emphasis on communities that have low levels of awareness. Funding comes from the New Zealand Government, through the Ministry of Research, Science and Technology, and the fund is administered by the Royal Society of New Zealand. The "E ruia mai project" hosted two science and technology awareness camps (called wananga). These wananga were specifically for Maori who are the indigenous peoples of New Zealand, with an emphasis placed on cultural-based principles associated with Maori language, customary practices and traditional values. The wananga were held at a Maori educational facility, this was pivotal to its success because Maori felt comfortable being in their own culturally safe environment. There was also an acceptance by Maori, knowing that the organisers were senior Maori post-graduate science students from the University of Otago. The students also presented their own research, and talked about study, awards, research and support networks within the wider scientific communities.
The participants were involved in small research projects all based around issues that affect Maori, such as language and cultural conservation. These projects were also designed to highlight the benefits of scientific research and knowledge, using technological tools and methodologies. This paper presents the processes involved in developing the project, it overviews the highlights, outcomes and issues then looks at future directions that similar type projects can follow.

Paper

Introduction:

This paper reviews a science and technology promotion project which hosted a science camp, or a wananga. Wananga were traditionally referred to as "places of higher learning". Therefore this particular wananga was designed specifically around the philosophies and principles of Maori culture, it was delivered under a Maori educational framework within a Maori community based environment, but the theme was mainly western-based science and technology.
In essence, the projects aim was to present an awareness campaign in a positive non-intrusive manner. In particular, it targeted an audience which has historically had limited access to, and little knowledge of science, mathematics and technology. As a consequence, the majority of Maori in this small community (especially the middle-aged and elderly) had harboured a reluctance or fear toward these aspects of our modern technological society. Although the audience was predominately Maori, which included families, extended families, groups, organisations, committees, boards and tribal groups, anyone else who was non-Maori was also encouraged to attend. The age groups ranged from children right through to retired elders. There is an important Maori custom that the role of the parents and grandparents be actively involved with their children at wananga of this nature. The project organisers and presenters were all Maori post-graduate students. They managed the project, planned and organised the wananga, and also presented their own research projects. Furthermore, they talked openly about study, awards, research and support networks at University. There were also discussions on topical issues about science and technology that affect Maori directly and indirectly (e.g. GE, health issues and the internet). The overall aim was to establish a much stronger awareness of science and technology, which created stronger links between the University of Otago, the senior Maori students and the wider Maori community. The result was a two-way mentoring process, where the students presented science based issues in a non-technical manner, and on the other hand, they were also nurtured by the community under the umbrella of the Maori language and culture. An important outcome of the wananga was to ensure that the Maori community participated in a series of small research projects. These were designed to highlight the benefits of scientific

research and knowledge with the use of technological tools and methods. The small projects were based around issues that affect the Maori community. Each research project also involved a number of field trips to Dunedinâ€™s Otago Museum, the Portobello Marine Science Laboratory and the University of Otago campus â€“ which included the computer laboratories, the science and general libraries and various science and technology departments.

1. Outline of the Project:

1.1 The Project
The main thrust of this project was to give special emphasis on promoting science and technology to Maori, as specified in the Science and Technology Promotion Fund which was administered by the Royal Society of New Zealand. Furthermore, the project also provided many innovative ways to highlight the value of science and technology to this target group, which incorporated a multidisciplinary approach to deliver a diverse range of small research projects.

1.2 The Venue
The wananga was held at a venue called a "marae", which was the most appropriate place to launch this project. This philosophy was pivotal to Maori, first and foremost to encourage their attendance, secondly, feeling more comfortable within their own environment to participate and become fully involved with the project. The marae-based principles helped to deliver both Maori philosophical and scientific approaches within the wananga environment. A Maori-based school called Te Kura Kaupapa Maori o Otepoti provided this environment, it was equipped with educational resources and facilities for teaching and learning.

1.3 The Research Clusters
The important outcome of the wananga was to ensure that the Maori community participate in a series of small research clusters called "Nga Whanau Rangahau". These were designed to highlight the benefits of scientific research and knowledge with the use of technological tools and methods. The clusters were based around issues that can affect the Maori community. Each research cluster presented their work on the final day.

1.4 The GE Discussion Panel
Gene technology is currently a topical issue throughout the world, with the political, scientific, social, ethical and now cultural debate causing much public concern. Therefore, an open forum with a panel of experts was held to discuss a Maori perspective on genetic engineering.

1.5 The Awards
Each research cluster had two small gift vouchers to present to selected members who showed an early commitment to their projects. All members were presented with a certificate to signify their participation in the wananga. Each cluster leader was also asked to identify a promising researcher/scientists in their cluster to receive a major prize. Also, a prestigious award by an anonymous donor for $500 was presented to an overall winner to assist in paying their fees for the "Hands on Science Camp" at the University of Otago in 2002.

1.6 The Visitors
There were a number and range of visitors to the wananga, from family members coming to see how things were being organised, helpers and cooks, to TVNZ's Te Karere and the Minister for Research Science & Technology the Hon Pete Hodgson.

2. Objectives:

The following objectives describe in detail the project.

2.1 Wananga and Participants
The wananga took place over two consecutive weekends (including Friday evenings) in late November and early December 2002. Eighty-nine registration forms were returned. There were

forty-nine females and forty males, with their age groups ranging from thirty-eight children, fourteen teenagers, twenty-seven parents and ten elders. Fifty-nine fully participated in the research clusters, which includes the eight leaders. Sixteen were in the Information Computer Science cluster, seventeen in the Marine Science cluster, sixteen in the Social Science cluster and ten in the Cultural Conservation cluster. There were twenty-nine males and thirty females. The remaining twenty-three registered participants visited the clusters when they were available. On the final day of the research cluster presentations, the wananga prize giving and the concert, there were 105 visitor entries on the day registration form. Their age groups ranged from twenty children, twenty-three teenagers, forty-six parents, and sixteen elders. There were many others who attended but did not sign the day registration form, this number was estimated at about thirty. There were also sixteen helpers (cooks and kitchen hands) which brought the final participants up over 200, twice the estimated total as initially expected.

2.2 Research Projects

The wananga hosted the following research projects/clusters;

i) Computer information science research cluster;
ii) Marine science research cluster;
iii) Social science research cluster;
iv) Cultural conservation research cluster.

Each of the clusters had two leaders and a set of guidelines. Each cluster was also given a Maori name and a title.

2.2.1 Computer Information Science - Te Whanau Rangahau Rorohiko The title of this research cluster was called "Te Mihini Atea Rorohiko: The Evolution of the Internet - A Maori Perspective". The research cluster addressed some of the common misinterpretations associated with the internet, the differences between the internet and the world wide web, dispelling a few myths, and presenting a statistical analysis of its use. Furthermore, the cluster allowed members to be involved in developing a small Maori-based internet website of the overall project.

2.2.2 Marine Science - Te Whanau Rangahau o Taimoana Putaiao The title of this research cluster was called "Nga Parengo: Inter-tidal Seaweeds". The aim of this research cluster was to look at, identify and investigate how local seaweed species were traditionally used by Maori. They talked about seaweeds in general, such as the different seaweed divisions (green, red and brown), and why seaweeds are divided into these groups.

2.2.3 Social Science - Te Whanau Rangahau o Matauranga Papori The title of this research cluster was called "What makes a good computer gunslinger?". Fans and critics alike often describe first-person shooters as games of mindless carnage. Regardless of the numerous opinions on the subject, we identified the factors that can contribute to being a successful player of first-person shooters. For example, psychomotor and cognitive tests used to test pilots, psychometric and demographic data, and Stroop reaction time.

2.2.4 Cultural Conservation - Te Whanau o te Hikoi ki te Uare Manuka The title of this research cluster was called "Te Hikoi ki te Uare Manuka". The aim was to go on a forest walk to provide the members with an experience based on some old-time Maori stories. The theme of the walk was encompassing the gathering and preparation of food from the forest. The members were introduced to some of the customs of the forest from two tribal perspectives.

2.3 Survey Results

The survey was designed to be in two parts, i) entry survey and ii) exit survey. The results in this paper are based on the entry survey only. The survey was web-based, therefore each respondent gained access to the survey via a web-browser during the wananga, and their responses were then automatically stored on a database which allowed quick access and analysis of the results.

2.3.1 Entry Survey

This survey was designed to look at the interest and awareness of science and technology by the participants, as well as their understanding of the scientific process in general. Furthermore, there were some questions about the benefits outweighing the harm and general understanding of science which were also intended to be gauges of peoples perceptions of science in general before the planned GE discussion. This was intended to identify a profile of how hostile people were to the scientific process in general, and also in the event that a statement resulting from the GE discussion occurred. The questions seemed to be answered more appropriately from the adults perspective. Nevertheless, the entry survey results showed a typical trend that would be expected from a sample of the general public.

The following results provide a brief overview. Forty-five participants did the survey, they were required to answer nine questions. The first five questions were based on demographics (e.g. the mean age of the participants was 20, with a standard deviation of 15). Question 6 asked "Do the benefits of science and technology outweigh the harm that they cause?" with 30% answering "They outweigh the harm", 56% agreeing that they "Are about equal to the harmful effects" and 16% answered "The harmful effects outweigh the benefits". The majority of the participants felt that the benefits of outweighing and being equal in effect suggests a typical conservative approach. Whereas Question 7 "How do you rate your understanding of the process of scientific enquiry?" rated high in the poor, below average to average category, which suggests that the participants either did not really understand the question, or demonstrated little knowledge of what is required for scientific investigatio! n. On the other hand, both Questions 8 and 9 showed an above average to average rating, respectively, for their interest and awareness of science and technology.

Overall the participants seem to have demonstrated a general public view of science and technology, with some positive results coming through in terms of interest and awareness. This is not surprising due to the theme of the actual wananga itself maybe having an influence on the participants and their responses.

2.4 The Web-Site

Developing the website for the project was an ambitious task, but was seen as an important mechanism to continue the science and technology promotion way past the actual wananga. Because of the short time period, the technical constraints involved in the design, the practical limitations associated with location and web-based services, and also most of the source material had to be designed and produced from scratch, these were all limiting factors. Although the website was still developed and launched in record time, it is still a proto-type undergoing further construction. But the main structure containing basic data exists to provide the general viewer enough relevant information to understand the overall theme of the project. All the technical details were handled by a Masters Student from the Department of Information Science who had a technical proficiency and in-depth knowledge of web-based design. This project also included members from the computer information science research cluster, they contributed towards the design and development of some of the websites features. Although the core structure for each web page was developed, the members added the articles, stories, photo's, bio's and some graphic work to their particular pages. This process was also used to develop the other clusters pages in the future. The current location for the website (and the survey) was only being used as the development and testing site. When the site has been fully tested and the material accepted for public use, it will be transferred to the website for the National Association of Maori Mathematicians, Scientists And Technologists (NAMMSAT) at <http://www.nammsat.org.nz/eruia>.

Apart from the four main pages, a fifth page is to be developed that will contain a number of documents that can be downloaded to supply further information to interested parties who may want to organise and run similar projects. There is currently some discussion about what can (and should) be made public, and what information should remain with the Association and the Royal Society. Additionally, a CDROM containing all the data, files, documents, artwork and materials will be burnt in the near future.

3. Additional Outcomes:

The following additional outcomes from the wananga were also seen as an important part of the success, and therefore are included here to provide a wider scope of issues that were addressed as instrumental in promoting science and technology to the Maori community.

3.1 GE Discussion

The panel comprised of a facilitator, two scientists from the Biochemistry Department, two senior Maori researchers from the Ngai Tahu Maori Health Research Centre, and a Maori Cultural Conservationist from the School of Education all based at the University of Otago. The audience was largely comprised of the parents from the wananga. The discussion was well received and many broad issues were presented; such as the Treaty of Waitangi, Maori culture, the environment, health and wellbeing. Also, the perception that scientists and academics were isolating themselves from the public due to the GE debate backlash was lively discussed, with a call that more of these types debates be held around the country. The main agreement from both the panel and audience was to support NAMMSAT's statement to the Royal Commission for Genetic Modification in Oct 2000, that more consultation and engagement with Maori communities that specifically provides for their needs and concerns when addressing issues of genetic modification, genetically modified organisms and products. "What is needed is time, space, and resources to discuss and develop what these parameters are".

3.2 Static Displays

Local agencies, groups and organisations supplied a large number of posters and fliers, with handouts, business cards and an assortment of information packs for the participants to take away. This aspect of the wananga was well received with both the vendors and participants showing interest in what was being offered.

3.3 Project Management Plan

One of the key factors in co-ordinating the project was the development of the administration and management plan. This plan had four strategic areas which focused on the administrative procedures, the marae venue and participants, the research clusters, and the GE Discussion. The project committee used the plan before, during and after the wananga to check and "sign off" tasks when they were completed. In this way not many of the planned events, tasks or human issues were missed. The plan's was then used to help with the reporting process back to the RSNZ. It should also provide a good systematic framework for future projects.

3.4 Final Concert

After the four research clusters had presented their work, the main dinner provided over two hundred visitors and participants with a traditional styled meal with many seafood delicacies. After which the final concert was used as the appropriate celebration to close the wananga. Many local Otago Maori artists and performing groups entertained the large audience whilst witnessing the presentations of certificates to each cluster in between traditional music, song and performances. The main event saw the local Maori school children close the entertainment before all the organisers and helpers were acknowledged and also presented with certificates and awards. The wananga was then officially closed with speeches, farewells and blessings by the elders. Many said that this event and the wananga will be remembered because it maintained the essence of a Maori way of life throughout the entire period, even though science and technology was always the focus and the underlying theme.

3.5 NZ International Science Festival

The NZ International Science Festival formally invited the E Ruia Mai organisers to be part of their event in Dunedin in 2002. It was agreed that the synergies between the two groups were seen as an enormous attraction to a much wider audience, now especially in the local Maori community. The core of the project committee continued to meet to develop a presentation, the RC displays and an interactive multimedia show to highlight the successful mix of Maori culture and language with science and technology.

3.6 E Ruia Mai Promotion Poster

A large A1 colour poster was designed to promote the project, but also, it promotes the Maori postgraduate students who took part in the project. Their photos and bios are designed to signal to the viewer that they could, one day, also be a successful young scientist undertaking research at University. The poster is the centre piece of the project, because it contains all the relevant information surrounded by many traditional Maori icons. This mix of text and graphic representations integrates the western and Maori worlds of science in a fashion that can be acceptable to both. The poster will be part of the presentation of this paper. Two copies of the poster have been printed, with the University of Otago Maori Centre holding one, which will be used when they go on student recruitment drives and other promotional campaigns. The other will be loaned to individuals, groups and agencies who want to use it for their own promotions, such as the NZ International Science Festival or the Royal Society.

3.7 Certificates, Awards and Prizes

Over one hundred certificates were presented to all the participants in each research cluster, the RC leaders and organisers, the workers, and the elders. The awards were presented in recognition of the four promising research students, one was selected from each research cluster. The recipients received an electronic personal diary/calendar and organiser, it can also be networked to a PC for downloading names, addresses and updating other information. The prestigious award for $500 was presented to a young secondary school student from the computer information science research cluster. She has already attended the "Hands on Science Camp" at the University of Otago in 2002. She has just completed School Certificate and wants to continue with IT. The Maori Centre will also get her involved in other activities throughout the year. Prizes and small gifts were also presented in recognition to the many helpers and supporters who gave freely of their time and effort to make this project so successful. One elder said that this was the first time they had ever received a gift for doing something they have always done in the past to support their local Maori community.

4. Documentation and Materials:

The following documentation and materials were produced and are now archived for future use;

1. Minutes from ten meetings;
2. A series of articles promoting the project;
3. Detailed programme of the two wananga;
4. A budget outline;
5. A detailed budget with a breakdown of all costs;
6. Outline of the research clusters;
7. Four research cluster programmes;
8. A large set of RC projects, stories, bios and artwork by the participants; 9. Various letters to service agents, groups and individuals; 10. Various GE related material, posters, pamphlets etc;
11. Colour pamphlet including a registration form;
12. Large set of graphic artwork specifically designed for the project; 13. Artwork and text for the large A1 posters; 14. Small poster advertising the project; 15. Certificate template; 16. Large collection of digital photos; 17. Administration and management plan; 18. Initial project proposal; 19. Interim project report; 20. Series of profiles of the postgraduate students; 21. Database for the survey data; 22. Database for the registration data 23. Web-based server for the website data.

All documentation is currently available in hardcopy form, and will also be available on a CDROM in the near future. Certain documents and artwork can also be accessed from the website once it is launched.

5. Acknowledgements:

The project committee thanked the following individuals, groups, agencies and services for all their help and support. Along with all the participants and visitors, these people also contributed to the success of this wananga.

5.1 University of Otago Services
The Maori Centre, Te Roopu Maori, Department of Information Science, Department of Marine Science, Botany Department, Psychology Department, School of Physical Education, School of Education, University Print, Student Services, Student Union, Information Services, Library, Commerce Division, Science Division and the Archway Shop.

5.2 Community Services
Te Puni Kokiri, Te Kohanga Reo, Araiteuru Kokiri Centre, Akona Te Rangatahi Trust, Te Roopu Tautoko ki te Taonga, Te Hou Ora, Te Ao Maori and the Art School at Otago Polytechnic, Kati Huirapa and Mrs Anituatua Black.

5.3 Other Agencies and Organisations
The National Association of Maori Mathematicians, Scientists And Technologists, The Royal Society of new Zealand, The Ministry of Research, Science and Technology, the staff at the Hon Pete Hodgson's Dunedin Office and Te Karere at TVNZ.

5.4 Graphic Artwork
This is a special acknowledgement to Mr Bino Smith who provided the draft artwork which formed the basis of the logo, certificates, posters and web graphics. Mr Smith took time off from his busy schedule working with the "Lord of the Rings" design team in Wellington, to prepare the artwork.

5.5 The Royal Society of New Zealand
For administering the Science and Technology Promotion Fund. The project committee were very honoured to have been selected to deliver this project to their community, and hope that in the near future they are given the opportunity to run similar projects that target Maori participants.

6. Conclusion:

This paper provides an account of the successful science and technology promotion project undertaken for the Maori community. Furthermore, the success of this project can be attributed to the dedicated people involved either on the project committee (14), the marae committee (5) and the Maori advisory committee (4), because they all shared the same vision about running a science camp for Maori under the mantle of a marae-based wananga.
One of the benefits that was obvious, was how the Maori community also helped a number of our own students to feel welcome and comfortable amongst their own people. This may seem strange, but the reality for most is that Maori students who attend the University of Otago are isolated from the wider Maori community because they have this impression that the students and the University are unapproachable because of the many unknown boundaries that may seem to exist. This project has managed to break down some of those barriers and has brought both communities much closer together.

6.1 Recommendations
One of the important parts of this project was the debriefing meeting to discuss issues, sign off and complete tasks, clear all outstanding accounts and recommend any changes that can be used in any future projects. Apart from there only being small minor issues that were dealt with, there were three recommendations made which would slightly change any future programme;
i) Move the wananga from the weekends over to a four day week. This should be based on the "school-camp" structure, where children are released from school to attend;
ii) Rotate the research clusters to give each member some exposure to the others, but each will still remain in their "Core RC" to do the projects;

iii) Make the displays more interactive and informative, which should also be relevant to the overall project.

6.2 Logo Description

The bone carving is called a Manaia which was a gift from the families of Otago. It represents the guardianship of one of their own members who entered into the University environment in 1991. The significance of this gift has not been lost over the years, and it now plays a central part in the guardianship of the current and future Maori post-graduate students. The purple/blue background represents the Science colours at Otago University, which was the main focus of this project. The four-sided frames of the diamond represent the natural elements of Earth, Water, Wind and Fire, each in a cyclic rotation. The two spirals on each element signify the equal but opposite forces that help maintain balance within. And the segments on each spiral represent the endless pursuits of scientific discovery, innovation and knowledge.

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