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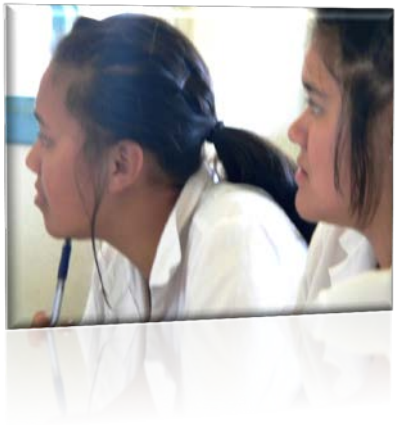
Te Whare Wānanga o Tāmaki Makaurau

Pacific Science for Health Literacy Pre-feasibility Study Report



A report to the Ministry of Foreign Affairs and Trade

Prepared on behalf of the project partners by Jacquie Bay and Bill MacIntyre

February 20, 2013

The Liggins Institute, University of Auckland

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This report has been prepared by the project leaders to reflect the evidence collected through consultation processes undertaken within the three partner countries, The Cook Islands, The Kingdom of Tonga and New Zealand, over the period July 2012 to January 2013, acknowledging also the current on-going development of the Activity Design Document.

The project team acknowledge the support provided by the New Zealand Aid Programme through Salli Davidson in the initial planning phase of the pre-feasibility project and the on-going support provided by Lavea'i Ioane during the pre-feasibility project.

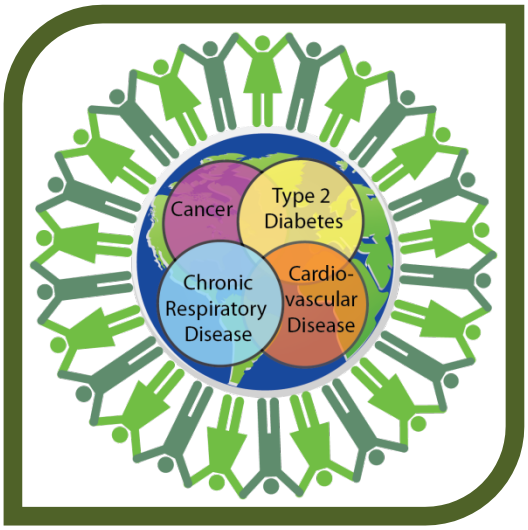
A full list of project participants is provided in Appendix 1.

Contents

Abbreviations Used

Australian Government Overseas Aid Program	AusAID
Cardiovascular Disease	CVD
Cook Islands Curriculum Levels (1-6)	CIC Level (1-6)
Cook Islands Education Master Plan	CIEMP
Cook Islands Curriculum Framework	CICF
Developmental Origins of Health and Disease	DOHaD
Gravida: National Centre for Growth and Development	Gravida
Healthy Start to Life Adolescent Education Project	HSLAEP
High-income countries	HIC
Liggins Education Network for Science	LENScience
Low- and middle-income countries	LMIC
Ministry of Foreign Affairs and Trade	MFAT
Noncommunicable Disease	NCD
New Zealand Curriculum	NZC
New Zealand Qualifications Authority	NZQA
National Certificate of Education Achievement	NCEA
New Zealand	NZ
New Zealand Aid Programme	NZAid
New Zealand Curriculum Levels (1-8)	NZC Level (1-8)
Pacific Science for Health Literacy Pre-Feasibility Project	The Project
Professional Learning and Development	PLD
The Kingdom of Tonga	Tonga
The Tongan Education Lakalaka Policy Framework	TELPF
School Year Level (7-13)	Year (7-13)
School Forms (1-7)	Form (1-7)
School Class Levels (1-8)	Class 1-8
World Health Organisation	WHO
WHO STEPwise surveillance	STEPS

1. Executive Summary



The Pacific Science for Health Literacy Pre-Feasibility project was developed by the Liggins Institute in response to a request from the New Zealand Ministry of Foreign Affairs and Trade (MFAT) to explore the potential for cultural adaptation of the LENScience Healthy Start to Life programmes in a Pacific setting.

The LENScience Healthy Start to Life Project brings together the expertise of education, science and the community to enable a life-course approach to NCD risk reduction, through development of science and health literacy in adolescents. In New Zealand the programme has resulted in sustained positive attitude, knowledge and behaviour change in participants. Additionally, 88% of participants became science and health communicators within their families, in some cases facilitating improved health behaviours in the home. In participating schools the programme facilitated positive change in science teaching practices which resulted in increased student engagement and attainment in science.

The pre-feasibility project facilitated the development of partnerships between New Zealand, Tonga and the Cook Islands to engage in exploration of the potential for cultural adaption of the NZ based programmes. This process has identified shared issues relating to health and education across all three partner settings and a high level of comparability in potential for this type of inter-sectorial programme development. Cultural, social, health and economic variances between the partner nations were analysed to ascertain the potential for cultural adaptation of the New Zealand programme. The evidence suggests that the potential for successful adaptation of the New Zealand programme in partner Pacific nations is very high.

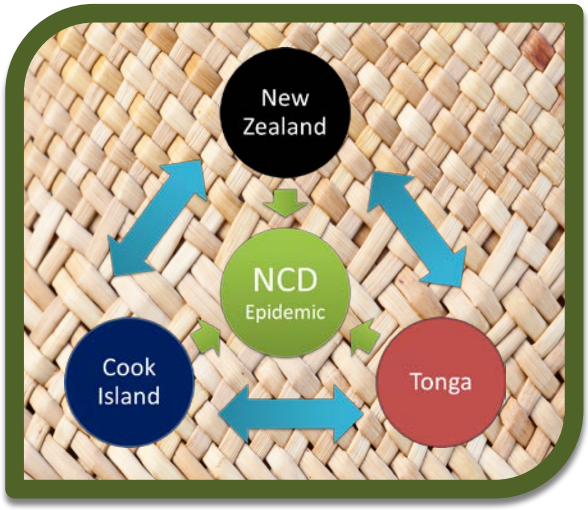
An action plan has been developed which proposes an intensive 3-year pilot programme which could see the co-construction of locally adapted core learning resources in Tonga and the Cook Islands, alongside significant leadership development required to enable sustainability. Robust monitoring and evaluation of this pilot phase would ensure the potential for evidence-based decision making regarding extension of the pilot to national and possibly regional reach.

2. Delivery of Outputs:

2.1. Partnership Development

MILESTONE 1, PART 1

The project enabled a process of engagement and communication through which has emerged the development of partnership agreements between New Zealand, The Cook Islands, and The Kingdom of Tonga.



The project partner group is multi-disciplinary and multi-cultural by nature. It brings together the skills and attributes required to facilitate the co-construction of collaborative multi-sectorial programmes within culturally appropriate frameworks, supporting science and health literacy development in Tonga and the Cook Islands. The partners have the capacity and vision required to develop leadership in the Cook Islands and Tonga, which could in-turn lead the extension of the programmes into outer-island communities in both nations. Furthermore, this leadership group will develop the capacity to work with leaders from other Pacific nations and facilitate the development of a network of programmes based on this model throughout the Pacific region.

The process of successful partnership development was supported by:

- the use of existing trusted professional relationships to initiate engagement
- prioritisation of face-to-face meetings where possible
- enabling space for reflection within and between partner groups
- ensuring space for the wider context of each setting to be understood
- the existence of common ideologies regarding:
    - the potential that education can offer in support of improved health, social and economic wellbeing within communities
    - the need for 21st Century learning environments to focus on student-centred, inquiry-based learning
    - the value of supporting teachers with high quality learning resources that offer the potential for adaptation to meet the needs of the learner
    - the potential benefits of multi-disciplinary approaches to address complex socio-scientific issues within society
    - the urgent need to add up-stream intervention to the matrix of strategies being undertaken to address the noncommunicable disease epidemic in the Pacific

2.2. Consultation and Visioning

MILESTONE 1, PART 2

The process of consultation and vision sharing between groups was facilitated by a combination of pre-consultation communication opportunities, documentation sharing and in-country consultation meetings. Through this process the following outcomes were achieved:

- partner groups shared their current vision for science and health education;
- the role of education in the development of social and economic wellbeing within the Pacific was discussed; common themes and challenges emerged;
- teachers, students, scientists and clinicians from participating New Zealand school, science and health communicates were able to share with partner groups their experience of the LENScience Healthy Start to Life programmes and the scientific evidence of Developmental Origins of Health and Disease underpinning these programmes;
- through a process of on-going discussion, the development of a vision for the co-construction of culturally adapted programmes linked to local curricula and local health promotion programmes was developed.

The LENScience programmes in New Zealand have been designed to support education and health needs of New Zealand communities. They contribute to the ability of teachers and schools to fulfil the goals of the New Zealand Curriculum (NZC) with respect to science education. They contribute to the ability of scientists to engage with the community to share evidence that has relevance to the health and wellbeing of individuals, families and society. In particular, the programmes address the requirement for learning resources that meet the needs of 21st Century learners, facilitating improved wellbeing at an individual, family and community level through improved science and health literacy.

The process of consultation and assessment undertaken in the Pacific Pre-feasibility Study recognised that the potential for adaptation of the concept to a Pacific setting would require development of locally relevant programmes. This process involved the Pacific and New Zealand partners sharing experiences relevant to science and health education, and developing a mutual understanding of the educational, social, cultural and health environments in New Zealand, Tonga and the Cook Islands. The sharing process provided the momentum to co-construct a vision for culturally relevant programmes by the project partners. The vision called for the rigorous evaluation of the efficacy of a pilot involving a small number of schools prior to potential population-level release. The pilot programmes, if funded, will be enabled by local leadership in the Pacific setting, working in partnership with the New Zealand team. If the evaluation process provides evidence of efficacy, planning would occur to enable local leadership to take the programme from pilot to population level use in Tonga and the Cook Islands.

2.2.1. Sharing our stories: Communication strategies

A range of communication strategies were used to allow all partners to share their current experiences, visions and challenges with respect to education and health, and in particular the role that science and health literacy has in supporting 21st Century communities. These strategies included formal correspondence, voice-based meetings via phone and where possible Skype, and face-to-face extended engagement opportunities. It was in the face-to-face exchange visits that in-depth immersion, discussion and planning occurred. Interactions included education and health sector leaders, school leaders, teachers, scientists, clinicians and students.

A range of published articles including print and digital-media, some of which were specifically written and produced to encourage communication within this project, were shared. A full list of communication artefacts and meeting opportunities is outlined in Appendix 2.

Technology and infrastructure challenges, particularly for Tonga, prevented three way phone conversations from taking place. The timing of the project, with a short lead-in phase, prevented the opportunity for a three-way face-to-face meeting which would have ideally occurred once agreement to proceed to development of a pilot plan had been reached. Nevertheless, there is a desire from all partners to explore avenues through which regular interactive communication can occur as the project proceeds beyond the pre-feasibility stage. We envisage that this will be initiated with a face-to-face meeting of key leaders from all three nations to enable relationship building, followed by on-going interactive communication via the LENScience Online Community, complemented with email and phone/Skype communication, and face-to-face workshops.

The LENScience Community is a purpose-built secure social-network, building on the experience of the LENScience Wiki Community (2009-2011). It is designed to enhance the potential for teachers, scientists and clinicians that are connecting to LENScience programmes to interact with each other, as well as with the LENScience team. Members of the community are educators/teachers, scientists, clinicians, and students. Different people have access to different groups. For instance in the test phase we have a group for Tongan and Cook Island teachers that are participating in the vision planning associated with this project. Secure, moderated spaces will be created in which students can interact with scientists, clinicians, and teachers.

Project participants in Tonga regularly use Facebook and other open online communities. They feel confident that infrastructure will not present a problem for teachers, however acknowledge that for most teachers connectivity will be via a personal laptop. The expected increase in broadband capacity to Tonga later this year is noted. A budget line to contribute towards the costs associated with broadband access within the test schools in Tonga is proposed. It is noted that initially this form of communication for participating Tongan

students would be mediated through their teachers. This offers a supportive structure in which teachers can explore the potential of wider interactions within the learning environment.

In the Cook Islands all teachers have recently received Netbooks through the Ministry of Education's Technology for Teachers Initiative, supported by NZAID. This project includes the required infrastructure such as Wi-Fi connectivity, to enable access to and participation within sites such as the LENScience Community. The introduction of the LENScience Community as a communication tool within this project is timely, offering a built-opportunity for teachers in the Cook Islands to explore the potential of online communities to support learning for students and for teachers. It will also enable exploration of interaction for students with members of the health and science communities. As in Tonga, for some classes this will be mediated through the classroom teacher. However for the Tereora College Inquiry Class (Year 9) this will provide a resource to explore the potential of direct interaction between scientists, clinicians and students, all of whom have netbooks with internet access at school. The project moving forward offers the opportunity to explore the potential for collaboration between these Tereora students, and students in parallel classes at Tamaki College in Auckland, all of whom have netbooks. As with Tonga, the significant cost of broadband access is acknowledged and a contribution to this cost included in the proposed budget.

2.2.2. School Curricula: Assessment of comparability

Significant commonalities exist within the overarching vision for science and health education in New Zealand, The Cook Islands and Tonga. These relate to key pedagogical concepts underpinning appropriate education models that meet the needs of 21st Century learners. In particular, they include the development of skills and competencies that support life-long learning capability. There also exists shared understanding that learning programmes must be constructed to relate to the social, cultural and educational needs of a local community. Hence in the curriculum frameworks for each nation there are key differences which pertain to cultural and social setting at a national level. Moreover, there is a commitment to diversity of application in order to facilitate school communities to develop learning environments that match local community settings.

Relatively recent curricula development has occurred in all three settings. As in New Zealand, curriculum documentation in the Cook Islands is currently stable, with the focus being on the development of resources (people and physical) to enable the enacted curriculum in classrooms to support the vision outlined in the curriculum framework. New Zealand Aid supports aspects of this development. In Tonga, recent curriculum development processes have been supported by funding from the New Zealand and Australian Aid budgets. These processes are currently facilitating change in learning and teaching

environments in Class/Year 1 – 8. Development of revised curricula for Forms 3-7/Years 9-13 is in progress and will support change over the coming years.
The process of consultation identified key aspects of the LENScience Science for Health Literacy pedagogical model that support the vision for learning expressed to varying degrees within the curriculum frameworks in all three settings.
These include:

- directing the focus of learning towards the individual learner;
- developing metacognitive thinking and inquiry competencies;
- developing conceptual understanding that facilitates scientific and health literacy;
- centring learning within contexts of social and cultural relevance to the learner;
- utilising inquiry-based learning models.

Variation exists in the level to which these visions are being enacted in classrooms in the three nations. This is partially derived from social and cultural differences, and partially derived from physical and human resource variance. In all three settings, a spectrum of experience can be observed.

The structure of science learning in each setting has broad similarities in terms of core learning strands, including specific strands that support the development of scientific skills and attitudes. These strands were replaced in the 2007 New Zealand Curriculum with the *Nature of Science* strand[1]. The focus on development of scientific literacy including understanding of the Nature of Science forms the overarching focus of the New Zealand curriculum. Aspects of Nature of Science understanding are present in both the Cook Island Science Curriculum Statement[2] and Tongan Science Syllabi.

A strong focus on content knowledge is evident within the Tongan Science Syllabus[3]. The tendency for learning environments to be strongly teacher-centred in Tonga was identified by participating Tongan teachers. They have a desire to make a step-change towards student-centred learning supporting development of science and health literacy and envisage that the project will support this process.

All three curricula share a stated aim to acknowledge that people from different backgrounds and cultures have different ways of experiencing and interpreting the natural and physical world. The requirement for respect within the science learning environment for traditional indigenous knowledge about the natural and physical world is evident across all three settings.

Exploration of the relationship between science and society is present within all three curricula. The introduction of context-embedded learning, such as that developed within the LENScience Science for Health Literacy pedagogical model, as in New Zealand, is not common in either Tonga or the Cook Islands. The opportunity for development of culturally-relevant, curriculum-linked, context-embedded learning programmes, within which the

culture and nature of science can be explored, is timely and significant for both Tonga and the Cook Islands.

2.2.3. Noncommunicable diseases: Comparative risk and disease burden

As with education, there are significant commonalities in relation to the public health issues to which this programme aligns in the partner nations. Noncommunicable diseases (NCDs), comprising cardiovascular disease, cancer, chronic-respiratory disease, and diabetes, account for 63% of deaths globally and 75% of deaths in the Western Pacific Region[4]. For both the Cook Islands and Tonga NCDs account for 74% of total deaths[5]. While NCDs account for 91% of total deaths in New Zealand, this difference is related to the reduced impact of communicable, maternal perinatal and nutritional conditions on mortality rates in New Zealand. It is anticipated that by 2020 the Western Pacific Region will have the highest total number of NCD deaths globally (12.3 million deaths), with the greatest increase occurring in low- and middle-income countries (LMIC) within the region [ibid].

NCDs are associated with a high level of economic and social burden related to impact on quality of life, cost of health care, and the effect of loss of productivity and potential income. Both morbidity and mortality contribute to this burden, and have the potential to force families and communities further into poverty, a factor strongly associated with increased NCD risk and disease burden. Differences in the rate of premature NCD morbidity and mortality are of major significance when examining the relative NCD risk and disease burden in New Zealand, Tonga and the Cook Islands.

Rates of premature NCD morbidity in the Cook Islands and Tonga are significantly higher than for New Zealand by total population. For example the incidence of diabetes in males aged 25-64 years in Tonga is 16.3%[6] and in the Cook Islands 26.1%[7], compared to 4% in males aged 15+ years in the total NZ population[8]. However NCD morbidity rates for the NZ Pacific Island population are significantly higher than those found in the total NZ population. For instance while the total rate of diabetes in the NZ male population aged 15+ years is only 4%, the rate for Pacific males in the NZ population aged 15+ years is 14% [ibid].

Approximately one quarter of NCD related premature deaths in LMICs occur before age 60, during the most productive stage of life[4]. While in NZ only 12% of NCD deaths occur in people under the age of 60, in Pacific Island nations, an average of 41% of NCD deaths occur in this age group[9]. For the Cook Islands this figure is 36% and for Tonga 31%, highlighting a significant difference in social and economic burden in comparison to New Zealand. As with morbidity, the rates of NCD mortality in the NZ-Pacific population are much higher than in the total NZ population. For example the amenable mortality rate for cardiovascular disease and diabetes in NZ for Pacific males was 2.5 times the rate for total males and for NZ Pacific females it was 3.2 times the rate for total females[8].

Estimations indicate that 80% of premature deaths caused by heart disease, stroke, and diabetes could be postponed through changes to behaviours throughout the life-course surrounding the major causative risk factors of tobacco use, unhealthy diet, physical inactivity and harmful use of alcohol[10]. Tonga and the Cook Islands carry a higher level of NCD burden related to these risk factors than New Zealand[5], however once again, the burden carried within the NZ-Pacific population is significantly higher than that of the total NZ population[8,11], aligning more closely to the Cook Island and Tongan populations and linked to the over-representation of these populations in New Zealand's lower socio-economic communities.

In the Cook Islands, 75% of adults have lower than recommended daily exercise levels, 82% eat less than 5 portions of fruit and/or vegetables daily, 89% are overweight and 61% are obese. Relatively high rates of overweight and obesity are also evident in younger adults (25-34 years). 90% of males and 85% of females are overweight in this age-group, with 56% of males and 65% of females falling within the obese category[7].

In Tonga, 44% of adults have lower than recommended daily exercise levels, 93% eat less than 5 portions of fruit and/or vegetables daily, 84% are overweight, and 57% are obese. On average, adult Tongans are eating only 1.3 servings of fruits and 1.1 servings of vegetables daily. High rates of overweight and obesity were seen in younger adults (25-34 years). 86% of males and 93% of females are overweight in this age-group, with 55% of males and 73% of females falling within the obese category[6].

Within the NZ-Pacific population 42% of males and 45% of females are meeting the recommended 3-servings of vegetables daily, compared to 60% of males and 72% of females in the total NZ population. There is no significant difference in fruit consumption between the NZ-Pacific population and the total NZ population, with 50% of males and almost 70% of females meeting the recommended intake of 2-servings daily. The NZ-Pacific population has an obesity rate of 65%, compared to 25% in the total NZ population. Similarly to the Cook Islands, the differential burden of obesity is seen at a young age. The rate of obesity in NZ-Pacific children aged 2-14 years (23.4%) is much higher than that in the total NZ population (8.3%). There is no significant difference in the activity levels between the NZ-Pacific population and the total NZ population[8].

The issues facing the adolescent population in the Cook Islands and Tonga with respect of NCD risk reduction and disease prevention are considerable. While not equivalent, the issues faced by low socio-economic communities with high Māori and Pacific populations in Auckland where the LENScience programmes have been proven to support behaviour change have strong parallels. This suggests that from a health perspective the development of culturally adapted programmes in the Cook Islands and Tonga has potential to contribute to the matrix of effective NCD risk reduction and disease prevention programmes.

2.2.4. Culturally adapted LENScience programmes: Assessing the potential to support health and education goals in Tonga and the Cook Islands

The 2011 United Nations Summit on NCDs called for multi-sectorial approaches to achieve improved health literacy, leading to informed decision-making to support NCD prevention and control[16]. The LENScience Healthy Start to Life programme offers one such approach. The LENScience school-based intervention based on our science-education-community partnership model[12], and employing our Science for Health Literacy pedagogical approach[13] has been proven to be effective in the New Zealand setting[14]. Evaluation of education and health contexts in Tonga and the Cook Islands suggests that the opportunity to work in partnership to co-construct culturally adapted programmes, based on the LENScience model, offers an opportunity to contribute to education and health goals in both nations.

From an education perspective the development of such programmes at this time would link into and compliment current programmes working to facilitate:

i. curriculum development and an increased focus on student-centred learning in Tonga
ii. teacher capability development to support implementation of the new Tongan Science Syllabus, Class 7-8 (and in time that for Forms 3-4)
iii. the use of inquiry based learning within the Cook Islands from Year 9 upwards
iv. increased focus on student-centred learning in the Cook Islands
v. integration of ICT capabilities for teachers and students in the Cook Islands, including the potential of blended e-learning to support teacher professional learning and development and enhance student learning
vi. teacher capability development to support (iii – v) above in the Cook Islands

From a health perspective the development of such programmes at this time would create a portal through which NCD risk reduction and disease prevention can be addressed during adolescence, adding value to the matrix of current programmes, primarily focused on the adult population.

Additionally, it is identified that there is clear scientific evidence that early-life environment (before birth) contributes to adult NCD risk, independent of later-life environment[15]. Supporting the development of sustained positive diet and lifestyle behaviours in Pacific adolescence prior to reproductive years will support increased NCD risk reduction in the future offspring of this adolescent generation.

The challenge presented by the need to empower individuals, families and communities to make significant changes to behaviours that are embedded in a complex mix of social, cultural, economic and environmental influences within the Pacific setting is recognised[7]. It is therefore significant that the model on which the LENScience programmes are based recognises and addresses this complexity. Through cross-sector collaboration teachers are

offered the opportunity to explore the social and environmental determinants of health and understand the role of nutrition throughout the life-course on life-long wellbeing and health potential. Teachers in-turn, facilitate age-appropriate exploration of these issues by adolescents, supporting science and health literacy development, which in-turn empowers participants to use this knowledge and understanding in decision-making.

The potential for the school-based programmes to engage adolescents in understanding of the health value of consumption of local foods offers a further opportunity to include aspects of food growth and supply and link into identified strategies within local NCD risk reduction matrices[7]. Schools, alongside churches and workplaces are already identified as potential settings in which to engage in activities to support this goal[6]. The proposed programme offers the potential to develop and evaluate this potential in a school-setting. Similarly, linkage between development of understanding of the health issues and the determinants of wellbeing, alongside exploration of the value of regular physical activity offers strong potential for cross-curricular linkages into health and physical education programmes. The emphasis of the LENScience model on students taking action at an individual, family and community level (inside or outside of school) offers support to identified strategies facilitating NCD risk reduction in both nations.

Both partner nations have considerable NCD risk reduction programmes targeting adults, but neither has school-based, *curriculum linked* programmes targeting science and health literacy development in adolescents to enable development of self-efficacy, supporting active engagement in wellbeing. This programme targets an identified opportunity to address NCD risk prior to childbearing years, thus simultaneously impacting on current and future generations. The 2011 United Nations NCD Declaration calls for contributions from evidence-based education in schools to support prevention and control of NCDs[16]. Similarly, AusAID have identified that in Tonga priority should be given to the development of a coordinated NCD schools programme to address the enormous future burden of disease associated with obesity in the young[17].

LENScience offers a proven adolescent educational intervention, embedded within standard school programmes, making a cost-effective contribution towards addressing the long-term requirements of NCD risk reduction at population level.

2.2.5. Culturally adapted LENScience programmes: Issues for consideration

Underpinning the potential for success of the proposed programme is a philosophy of partnership based on recognition of the importance of social and cultural settings, co-construction of planning, development and evaluation, the importance of linking into existing and potential future related programmes. It is essential that alongside this sits the development of locally-led leadership enabling long-term sustainability.

The development of a leadership team that has strong ministerial and school-level links within the partner-countries, supported by a stable leadership group within New Zealand is a priority. The pre-feasibility study has initiated the process of establishing this group, which will be further developed in the early stage of the pilot project. The development of this leadership team over the period of the 3-year pilot will enhance sustainability of the project by ensuring local-ownership of the development process and enabling local leadership that can direct and manage implementation beyond the pilot phase.

Forward planning and time-lines that link into related school and health-sector programmes for all three partners are essential to the success of the project. We recognise that the timing of the pre-feasibility project from July 2012 – January 2013 meant that it was unavoidable that the initial face-to-face consultations occurred during September, a very busy time in the school year. While the short-term nature of the pre-feasibility project did not offer scope for flexibility, planning to ensure that the pilot-project is well-matched to the school-year is in place.

The centrality of local-content in the stories that initiate each of the curriculum-based modules is vital. This initial local-content then requires links into the context (the NCD epidemic) and scientific evidence at a regional and global level to enable visualisation of the Cook Islands and/or Tonga as leaders in science and health locally, as well as collaborators in the multi-national science and health communities. Alongside this sits the centrality of culturally-embedded practice in education and health which through local-leadership, will inform and shape programme planning, development, implementation and evaluation.

Community participation is required at all levels within the programme. The model supports community links, created through the setting of the school. Effective systems of communication within participating school communities that reach teachers, students and families are essential. Equally communication within the health sector and between health and education participants is vital to the success of the programme.

Robust systems of monitoring and evaluation must be embedded within the project. The WHO recommends that close monitoring and evaluation of the process of implementation of multi-sectorial actions in health is required in order to determine progress in achieving planned outcomes, and identify opportunities for productive changes in approach[18]. In New Zealand we have found that in addition to informing intervention investment decisions, the sharing of the evidence collected through monitoring and evaluation empowers and motivates participating teachers, scientists, clinicians, and communities.

2.3. Learning from the Process of Exchange

MILESTONE 2

Appendix 2 provides detail of the methodologies of exchange and the artefacts used to support the process of exchange

The process of exchange visits between New Zealand and the Cook Islands and Tonga facilitated engagement which enabled exchange of ideas, development of understanding of cultural settings and co-construction of a vision for potential partnership development. All participants in these processes reported that the opportunity to experience others contexts and cultural settings first-hand and spend time discussing the proposed development opportunities presented by the project added significantly to their ability to collaborate within the partnership and develop shared a vision for the project. Additionally the relationship development within the wider project team and associated school, university and clinical settings offered the potential for development of professional connections that will reach beyond the realm of this project.

The potential for collaboration through partnership and co-construction of culturally adapted programmes in Tonga and the Cook Islands that emerged from these meetings is described in section 2.2. This enabled the development of the vision proposal that was presented to MFAT for consideration under the New Zealand Partnership Development Fund.

2.4. Proposal Visioning

MILESTONE 3

The proposed vision is contained in the proposal document found in Appendix 4 and summarised in the diagram on page 16.

LIGGINS INSTITUTE
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Te Whare Wānanga o Tāmaki Makaurau

SCIENCE EDUCATION DRIVING SOCIAL AND ECONOMIC WELLBEING

PEOPLE | PARTNERSHIPS | PATHWAYS

LENScience Pacific Science for Health Literacy Pilot Project

- The Pacific Science for Health Literacy Pre-Feasibility Project has explored the potential for cultural adaptation of the LENScience model to support strategic health and education goals in The Cook Islands and The Kingdom of Tonga.
- LENScience supports scientific literacy development; enabling the communication and translation of science within society.
- LENScience is internationally recognised as an innovative development in science and health education which is unique in marrying pedagogical, scientific and health expertise to support improved long-term social and economic wellbeing.
- The development of LENScience (2006 -) is a response to the need for effective inter-sectorial programmes to address the critical issues of scientific literacy and health literacy, and the widening gulf between science and society; this is a relevant issue in the Pacific.
- LENScience brings schools and scientists together to enable integrated education programmes for 11 - 18 year old students in New Zealand schools, providing resources that contribute to addressing equity issues within society; the proposed project enables this to occur in a culturally appropriate setting using Tongan and Cook Island stories and international links.

Advancing Education

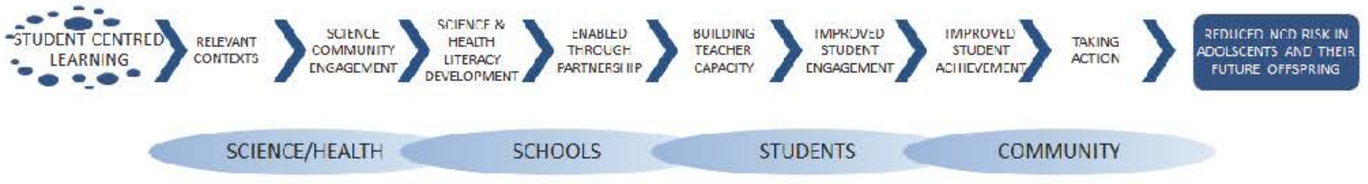
Through school-science-community partnerships the Project will provide:

- Context-embedded resources that link science learning to issues relevant to the lives of Pacific students and their families;, specifically the noncommunicable disease epidemic.
- Professional development, building teacher capability in science, health and the use of inquiry-based learning models.
- Learning environments that enable science and health literacy development for adolescents, facilitating self-efficacy.
- Programmes that enable students to explore the culture, nature, and process of science.
- Visualisation of pathways into tertiary education and science related careers for students and their families.
- Equity of access to interaction with science and health communities.
- Development of professional leadership capability in education, science and health communities.

Advancing Health

- Facilitating health literacy in adolescents from at-risk communities.
- Facilitating noncommunicable disease (NCD) risk reduction in adolescents and their future children.
- Facilitating understanding of the links between wellbeing and guardianship of our natural environment and resources.
- Facilitating adolescents to become change agents for health and wellbeing in their families.
- Adding value to the matrix of NCD risk reduction programmes present in the Pacific by strategically supporting inter-generational risk reduction.
- Increasing the potential for diversity in the health community.
- Supporting long-term reduction in health spending.

LENScience: Effective School-Science-Community Partnerships



What we can deliver in a 3-year pilot porgramme

- Development and publication of a series of context-embedded learning and teaching resources for Years 7 - 11.
- Development and publication of resources to support the delivery of teacher professional learning and development.
- Delivery of a professional learning and teaching package that supports the implementation of the culturally adapted learning programmes to enable scientific and health literacy development.
- Delivery of context-embedded learning programmes from Years 7 - 11 in Tonga and the Cook Islands.
- Development and delivery of an evaluation programme measuring the potential of the pilot project to enhance education and support wellbeing in adolescents.
- Development and delivery of an evaluation programme measuring the potential of the pilot project to build capacity and develop leadership in teachers.
- Development of a cost-benefit analysis model that can be applied to show the potential social and economic impact of the pilot project in the Cook Islands and Tonga.

3. Risks and Risk Evasion

Risk analysis carried out within project planning leading up to the pre-feasibility study found that the likelihood of the project being impacted by significant risk factors that could not be mitigated through effective planning was low. During the period of the project no major risks and no minor risks that could not be overcome were encountered. The only identified risk encountered during the project related to the challenge of technological infrastructure capacity associated with telecommunications between Tonga and New Zealand. This challenge did not affect the overall progress of the project and is not considered to impede the future potential of project development.

4. Project Outcomes Overview

The Pacific Science for Health Literacy Pre-Feasibility project was designed to evaluate the potential for cultural adaptation of the LENScience model for use in a Pacific Island setting and establish a potential vision for such an adaptation to be used in a pilot study.

The pre-feasibility study achieved the development of partnership relationships essential for the evaluation of potential and formation of vision. These partnerships stretch from ministry-level to practitioner-level. They are represented by the Memorandum of Understanding established for the partnership development between the Liggins Institute and The Cook Islands Ministry of Education, and the Memorandum of Agreement established for the partnership development between the Liggins Institute and The Tongan Ministries of Education and Health.

The completion of the analysis of the potential for cultural adaptation and consequently the development and presentation of the proposal to move from pre-feasibility to pilot phase is indicative that the project achieved this stated aim.

The timing of the project in the second half of the academic year, resulting in inter-country exchanges that had the potential to clash with internal and external exam-periods within the schools was not ideal. A longer lead-in time to the project could have alleviated this issue and may be a factor to consider when working within the secondary-school setting.

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Appendix 1: Project Participants

Project participants took part in aspects of sharing of the New Zealand experience, consultation, review and/or proposal potential planning within the pre-feasibility project.

THE Cook ISLANDS

Maraurau o te Pae Apii - Ministry of Education

- Mrs Sharyn Paio, Secretary of Education
- Ms Ina Herrmann, Chief Executive Officer, Learning and Teaching Division
- Mr Matthew Easterbrook, Learning and Teaching Education Advisor
- Mrs Jane Taurarii, Learning and Teaching Education Advisor
- Mrs Anna Savage, Te Kakaia Coordinator
- Mrs Ina Tamarua, Early Childhood Education Advisor

Tereora College

- Mr Bali Haque, Principal
- Mrs Tania Morgan, Deputy Principal
- Dr Des Duthie, HOD Science
- Ms Janice Moore, Biology Teacher
- Rima Brown, Year 13 Student- Attendee, LENScience Summer School, New Zealand
- Iva Vakalabure, Year 13 Student - Attendee, LENScience Summer School, New Zealand

Te Marae Ora - Ministry of Health

- Mrs Karen Tairea, Nutritionist/NCD Coordinator, Health Promotion, Community Health Services

Nukutere College

- Mr George Rasmussen, Principal
- Mr Delaney Yaqona, Deputy Principal (2013)

Titikaveka College

- Mrs Mata Hetland, Principal
- Mr Delaney Yaqona, HOD Science (2012)

THE KINGDOM OF TONGA

Ministry of Education and Training

- Hon. Dr ‘Ana Taufe'ulungaki, Minister for Education, Women's Affairs and Culture
- Mrs ‘Emeli Pouvalu, Secretary of Education

Ministry of Health

- Dr Siale ‘Akau’ola Secretary of Health
- Dr Lei Saafi, Acting Director of Health
- Dr Paula Vivili, Superintendent of Health
- Members of the Tonga Health Foundation Team

Tonga High School

- Mrs Amelia Folaumahina, Principal
- Mrs Losana Latu, Deputy Principal
- Mrs Sipola Halafihi, HOD Science
- Mrs Fatefihi Fehoko, Science and Health Teacher
- The Science Department: 16 science teachers; associated maths and health teachers
- Year 13 science students consultation group:
    - Jone Waisele Junior; ’Ana Piukala; Solomone Timani;
    - Samuela Matekitonga; William Lavemai; Tevita Vingamoeahi
- Year 13 Student attendees: LENScience Biomed Summer School, New Zealand
    - Losana Vuki and Isileli Finau

Tonga College

- Mr Tenita Kalafitoni Latu, Principal

Tonga Side School

- Mrs Ati Pomana, Principal, Tonga Side School
- Mrs Asena Ma, Deputy Principal, Tonga Side School

NEW ZEALAND

The Liggins Institute

- Ms Jacquie Bay, Director LENScience
- Mr Bill MacIntyre, Visiting Senior Research Fellow
- Associate Professor Mark Vickers, Academic Director

Gravida: National Centre for Growth and Development, New Zealand

- Professor Phil Baker, Director

Tamaki College, Auckland, New Zealand

- Mrs Soana Pamaka, Principal
- Mr Chandar Dewan, HOD Science
- Participating teachers (contribution to hosting Pacific visitors)
- Participating Students and Alumni (contributions to telling the NZ story)

The Centre for Longitudinal Research, He Ara ki Mua, The University of Auckland

- Associate Professor Susan Morton, Director
- Dr Mary Hedges, Senior Research Fellow

Onehunga High School, Auckland, New Zealand

- Mr Brent Wagner, Deputy Principal
- Mrs Katherine Cole, HOD Science
- Participating teachers (contribution to hosting Pacific visitors)
- Participating Students (contributions to telling the NZ story)

McAuley High School, Auckland, New Zealand

- Ms Tasi Poumale, Acting HOD Science
- Participating Students (contributions to telling the NZ story)

One Tree Hill College, Auckland, New Zealand

- Mrs Nicky Burnett, HOD Science
- Ms Anau, White, Science Teacher (Ex Student Tonga High School)
- Participating Students (contributions to telling the NZ story)

Tangaroa College, Auckland, New Zealand

- Ms Wendy Folkard, HOD Science
- Participating Students (contributions to telling the NZ story)

Appendix 2: Consultation Methodologies and Artefacts

INITIAL ENGAGEMENT:

High-level written communication introducing the New Zealand programme and the opportunity for pre-feasibility was used to initiate engagement.

Opportunities for pre-engagement meetings where potential partners were visiting New Zealand allowed significant leaders from the Cook Islands and Tonga to meet with the LENScience team and with LENScience partner schools.

COMMUNICATION TOOLS: PUBLISHED ARTIFACTS

A number of published artefacts were used to assist in the sharing of experiences of health and education between partners, providing preparation for and complementing the key face-to-face communication opportunities.

THE LENSCIENCE STORY

- A 22-page booklet, The LENScience Story, was written by the New Zealand team to share our school-science-community partnership model and evidence of the effect that this has had, particularly in schools with high Māori and Pacific populations.
- Copies of key learning and teaching resources (print and media) used in the New Zealand programmes were shared.
- A series of three videos (Contexts of Relevance; Face to Face; Students as Researchers) were made by LENScience with the support of partner schools with high Pacific populations. These videos allowed New Zealand teachers and students to share their experience of the LENScience programmes. A further video from a series made to enable LENScience Alumni from our Māori and Pacific Engagement Programme was provided to allow the voice of programme alumni, now at university, to be heard.
- A series of three videos hosted by Hannah Burgess, a LENScience Alumna of Māori descent, were used to allow lead scientists, Professors Gluckman, Cutfield, and Cameron-Smith to share their research stories, and to allow Hannah to share her response to these stories, as a representation of the response of New Zealand youth to the stories of this research.
- Relevant academic papers and reports were provided.
- Copies of the New Zealand Curriculum were shared with the lead schools in Tonga. (The Cook Islands lead school and MoE were already familiar with this document).

THE TONGAN STORY

- Copies of key school-management and curriculum documents provided to the New Zealand team included:
    - School structure and programme outlines
    - Curriculum documentation for science
    - Assessment documentation for Science, Biology, Chemistry and Physics from forms 5-7
    - Examples of student project work that linked into exploration of environmentally based socio-scientific issues
- Ministry of Health data was provided to support understanding of:
    - the process of NCD surveillance
    - NCD disease risk and prevalence profile for Tonga (STEPS survey reports)
    - the role of the Tonga Health Promotion Foundation
- Media:
    - A video, *Tonga High School: The Student Voice*, was made by the Tonga-NZ team to share the story of Tonga High School, through the eyes of Year 13 students, with the science and education communities in New Zealand. The video was shot by a group Year 13 students using an iPad and edited by the NZ-Tongan leadership team. This low-cost process demonstrates the increasing potential of smart-phone and tablet technology for such projects.

      Raw footage to enable a similar video sharing educational vision and challenges from the perspective of Tongan teachers has been collected. As time allows, this will be made into a video and placed on the LENScience Community to enable international educators, scientists and clinicians participating in the online community to develop a better understanding of the Tongan context. Additionally a video recording the reflections of Mrs Sipola Halafehi regarding the potential offered by the project was recorded (*note this is a private clip and will be made available publically following edit processes).*

THE COOK ISLANDS STORY

- Copies of key education documents provided to the New Zealand team included:
    - Curriculum Framework
    - Science, Health/PE curriculum documents
    - Attainment profiles for senior students (Tereora College)
    - School and Ministry newsletters (via MoE web site)
    - Relevant examples of student work
    - *Note senior assessment systems are NZ based*

- Ministry of Health data was provided to support understanding of:
    - the process of NCD surveillance
    - NCD disease risk and prevalence profile for Tonga (STEPS survey reports)

Interactive Communication Opportunities

A range of face-to-face and phone interactive communication opportunities enabled partners to tell their story and explore together similarities, differences, and challenges.

Cook Island-New Zealand Interactions

In addition to voice-based interactions throughout the process, two visits were made by members of the LENScience team to the Cook Islands, and while in New Zealand for unrelated matters, Mrs Sharyn Paio met with LENScience and Onehunga High School staff at the Liggins Institute. We also note that members of the Tereora College leadership team who are involved in this project had an immersion visit to Onehunga High School earlier in 2012. During this visit the relationship between Onehunga High School and the Liggins Institute was discussed.

September 17-20, 2012

Representatives from LENScience, Onehunga High School and the Centre for Longitudinal Research were hosted by the Cook Islands Ministry of Education and Tereora College. Activities included:

- Immersion of the New Zealand team in Tereora College to observe classes, meet teachers, students and school leaders;
- Visits for the New Zealand team to Nukutere College, Titikaveka College and a range of primary schools;
- Meetings with key Ministry of Health staff - Health Promotion Unit;
- Meetings with Ministry of Education Staff;
- A consultation meeting including Health and Education from both countries at which relevant programmes in the Cook Islands and New Zealand were presented and discussed;
- A meeting with staff from the NZ High Commission.

November 2-6, 2012

Originally we had planned for members of the Cook Islands team to visit New Zealand, potentially once senior examinations had started. This was changed due to the timing of the grant proposal in mid-November. The NZ project leader met with the Cook Islands leadership team to engage in the development of the proposal, building on on-going communication between the groups. During this visit the NZ team leader was able to meet with the two students selected by the Cook Islands Ministry of Education to receive LENScience-Friedlander Foundation Scholarships to attend the LENScience Bio-Med Summer School in December 2012. Meetings with their families also occurred.

TONGA-NEW ZEALAND INTERACTIONS

In addition to voice-based interactions throughout the process, two visits were made by members of the LENScience team to Tonga and a return visit was made by two Tongan teachers to New Zealand. In addition, Mrs 'Amelia Folaumahina, Principal of Tonga High School, met with the LENScience and Tamaki College teams while in New Zealand for a conference earlier in the year.

SEPTEMBER 24-28, 2012

Representatives from LENScience, Tamaki College and Gravida were hosted by the Tongan Ministry of Education, Tongan Ministry of Health and Tonga High School. Activities included:

- Immersion of the New Zealand team in Tonga High School to observe classes, meet teachers, students and school leaders;
- Visits for the New Zealand team to Tonga College and Tonga Side School;
- Visits for the New Zealand team to Viola Hospital;
- Meetings with the Acting Director of Health;
- Meetings with key Ministry of Health staff from the Public Health and Health Promotion Units;
- Meetings with the Minister of Education and the Director of Education;
- A consultation meeting including Health and Education in both countries at which relevant programmes in Tonga and New Zealand were presented and discussed ;
- A meeting with staff from the NZ High Commission.

NOVEMBER 8-12, 2012

The NZ project leader met with the Tongan leadership team to engage in the development of the proposal, building on on-going communication between the groups.
During this visit the NZ team leader was able to meet with a group of senior students from Tonga High School to engage with these students in discussions about their vision for education and health in Tonga.

NOVEMBER 17-30, 2012

The NZ project team hosted an exchange visit to New Zealand by Sipola Halafehi, HOD Science Tonga High School, and Fatefehi Fehoko, Teacher, Tonga High School. This visit included:

- Attendance at the Gravida annual symposium where in addition to participating, presentations were given by the combined NZ-Tongan team about the project and by the Tongan team about their vision for Health-Education collaborations to support increased wellbeing;
- Participation in LENScience classroom programmes within the Liggins Institute;
- Immersion visits to observe classes and meet with students, teachers and school leaders at One Tree Hill College, Onehunga High School and Tamaki College.

TONGA-COOK ISLAND-NEW ZEALAND INTERACTIONS

DECEMBER 9-15, 2012

Year 13 students, Iva Vakalabure and Talia Brown from the Cook Islands, and Losana Vuki and Isileli Finau from Tonga attended the LENScience Bio-Med Summer School. This programme sits within the matrix of programmes offered by LENScience in New Zealand to support Māori and Pacific students. The theme of the summer school was the global NCD disease epidemic. The students participated in an academic programme exploring this epidemic and were challenged to develop a proposal for a competitive grant to implement a community action initiative supporting NCD risk reduction. Reflections with the Pacific students on their experience of immersion in a programme exploring science and health literacy within the context of the NCD epidemic gave valuable insight into the potential for development of culturally adapted programmes in the Pacific and the value of inter-country interaction for students.