

# **An Evaluation of the Effectiveness of Social Equity Strategies for Maori Students in the School of Science and Technology**

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*for*  
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**Co-ordinator**  
**Social Equity Office**  
**School of Science and Technology**  
**University Of Waikato**

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**The  
University  
of Waikato**  
*Te Whare Wānanga  
o Waikato*

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## **Executive summary**

In 1991 the School of Science and Technology (SOSAT) at the University of Waikato had a very low participation rate of Maori and students from other non-dominant ethnic groups. This situation was serious enough to concerned the then Dean of the School and strategies were developed to change this situation. Four major strategies are used to encourage, support and retain Maori students to successfully pursue and complete a degree in Science. They are: the Te Putahi o te Manawa programme - a mentoring programme; a scholarship and grant writing strategy (in particular assistance with Tuapapa Putaiao Maori Fellowships(TPMFs) administered by FRST); school visits; and field trips with secondary schools in the Waikato region that have a high proportion of Maori students.

The Maori & Psychology Research Unit (MPRU) was contracted by Gary Bramley of the Equity Office of the SOSAT to conduct this evaluation. The MPRU is based in the Psychology Department of the University of Waikato.

In this evaluation we sought to determine the effectiveness of the social equity strategies for Maori students in the SOSAT at the University of Waikato.

### ***The specific aims of the evaluation were:***

- i. to determine the extent to which social equity strategies within the SOSAT are having an intended effect;
- ii. to determine which of the strategies are working most effectively;
- iii. to highlight the barriers to the mentoring programme (for students)
- iv. to identify improvements that can be made.
- v. to investigate the impact of role models (such as the TPM fellows) on student behaviour

Evaluative information was gathered through administering questionnaires, completing key informant interviews, and completing focus group interviews. Participants in the evaluation were: Social Equity team members; Dr Jim McMillan from the Foundation for Research, Science and Technology (FRST); Kaitiaki; Maori students of the SOSAT; the Dean of the School of Science and Technology; Secondary School Science teachers who were Heads of their Departments; and Maori secondary school students. Statistical data about the enrolment and retention of Maori students in the SOSAT was provided to the evaluators by the social equity office.

### ***The major findings of this evaluation are:***

- i. That the social equity strategies targeted at Maori secondary school students appear to be having a positive effect, however, further tracking of this trend is required to confirm this.

- ii. That the social equity team's strategy of supporting Maori students in writing scholarship and grant applications has resulted in a creditable success rate for the competitive Tuapapa Putaiao Maori Fellowships from the Foundation of Research, Science & Technology.
- iii. That the Te Putahi o te Manawa mentoring programme provides students with support, but is under-utilised by Maori students in the SOSAT because of a failure to connect and communication difficulties. When Maori students make contact with kaitiaki, they are reported to continue with this relationship and derive satisfactory benefits. Generally, lecturers, tutors and demonstrators were reported to be the most helpful sources of assistance. This perception is possibly related to these sources of help being directly related to the courses that students are taking.
- iv. The combined strategies used by the social equity team are reported to enhance students' feelings of being supported. Although this was the case, Maori students of science also reported feeling shy and whakama about seeking help.
- v. Participants perceived that the lack of Maori academic staff within the SOSAT needed to change. Students felt that a Maori perspective of science could not be provided with the current academic staff and expertise. Appropriate role models, although present among more advanced students, were not present among the academic staff.
- vi. That the TPMFs were not widely recognised by school students, but that 55% of current science students in the SOSAT indicated that either some person (such as a teacher) or a good role model was influential in helping them choose science as a course. Furthermore, 46% of respondents said the lack of appropriate Maori role models was important in influencing their choices. On this basis we recommend that TPM fellows be required to continue in role modelling activities.

***We recognise that our evaluation has a number of limitations. They are:***

- Lack of baseline information, in the form of either a previous study, or in the form of ongoing evaluative material about the experiences of Maori university students in the SOSAT, means that we are unable to confidently report a contrasted result.
- Limited access to raw student data, which has limited our analysis of data.
- That the strategies employed must be considered to be still in a formative stage. Fine-tuning is still occurring; the effects of which cannot be determined at this point in time. The consequence of this is that we have been unable to clearly identify programme impacts even though possible impacts have been inferred.

### ***Recommendations***

In light of what we have found through this evaluation we make the following recommendations.

- i. That the Social Equity Office of the School of Science and Technology continue in their efforts to recruit Maori to university through school visits and field trips.
- ii. That the Social Equity Office of the School of Science and Technology continue to support Maori students in the SOSAT through the writing of grant and scholarship applications.
- iii. That the Social Equity Office and the Dean of the School of Science and Technology continue to offer Science-help tutorials and enhance the effectiveness of the Te Putahi o te Manawa mentoring programme by aligning mentoring activities with those of tutoring and demonstrating within the usual structure of courses offered by the SOSAT.
- iv. That the Dean of the School of Science and Technology take action to appoint one, if not two, Maori academic staff members to the School. In taking this action, we urge the Dean to consider that Maori academic staff are likely to have few resources readily available to them to support their teaching activities. In the initial period of their appointment support will be needed in order that they may develop a comprehensive research programme. Until such appointments are made, effort and support should be given to cultivating networks with and the participation of Maori in the wider community, as well as in science.
- v. That the Social Equity Office, with the assistance of the university's Teaching, Learning and Development Unit, seek to obtain regular, written evaluative feedback from kaitiaki and Maori students.
- vi. That TPM fellows be more proactive in asserting that they are recipients of these scholarships and discuss with others what being a scholarship recipient means to them.

## **Acknowledgments**

We would like to acknowledge the time and energy taken by all participants in this evaluation in providing us with feedback about the social equity strategies employed by the School of Science and Technology. We also wish to make special acknowledgment of the consideration that Maori students of science and Maori secondary school students have given us in sharing personal and sometimes painful details of their experiences in their respective contexts. We admire your courage and perseverance.

Lastly, to the staff of the Social Equity Office, and to Gary Bramley - our thanks for your help in facilitating our access to participants, to literature, and to enrolment and retention data for Maori students of science.

*Kia kaha, kia maia, kia manawanui,*

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## **Section 1: Background and context of support strategies in the School of Science and Technology**

Historically, Maori have experienced low levels of participation in tertiary education. Indeed in some subject areas, Maori have almost been totally absent. Examples of this history are reflected in Maori participation in certain careers - medicine (150 Maori out of approximately 10, 000 doctors - 1.5 per cent), architecture (five Maori out of approximately 2,000 architects - 0.25 per cent, Jefferies, 1997). While Maori participation in tertiary study has increased considerably over the last decade, participation in some career areas remains low. This continued situation for some careers is likely a reflection of a number of factors including: high entry criteria; lack of interest in a given occupation for Maori; lack of support networks and high attrition rates. Groups such as NAMMSAT (National Association of Maori Mathematicians, Scientists and Technologists), FRST, Te Puni Kokiri, and many tertiary providers (Universities, Polytechnics and Wananga) are trying to develop strategies to improve Maori participation in areas where Maori are under represented (*Jefferies, 1997, p.53, Martin, 1996, Hawke and Morrison, 1994*).

In this section we set out to provide a context for the evaluation of social equity strategies used to recruit and retain Maori students in the School of Science and Technology (SOSAT) at the University of Waikato. We begin by briefly reviewing what has been identified in earlier literature as barriers that inhibit or impede the active participation of Maori in tertiary education generally, and outline those equity strategies employed by the SOSAT to recruit and retain Maori students in science. Following this is a section that examines that literature relating to mentoring. This is in order, as a primary strategy employed by the SOSAT is based on establishing a mentoring relationship between graduate and undergraduate Maori students. In section three we outline the aims of this evaluation. Later sections deal with the method employed, findings and recommendations.

### **Barriers to tertiary education experience by Maori**

The most comprehensive examination of barriers facing Maori participation in tertiary education was a study completed by Jefferies (1997) on behalf of Te Puni Kokiri. Jefferies points out that over the last decade, although there has been an increase in activities designed to increase Maori participation in university education, he could find few studies that comprehensively examined the effectiveness of such strategies. Where studies have been completed, they are usually small scale and inadequately rigorous. The result is a rather patchwork account of what is occurring nationally. What is particularly useful about Jefferies' study is his documentation of reported barriers that Maori face in their move towards higher education. Many individual accounts also provide clues to barriers Maori people encounter. Some of these are summarised as follows:

- Failure to reach required levels in primary and secondary school education to allow entry into tertiary education.



- Negative teacher expectations and negative experiences with teachers.
- The culture or environment of schools and other institutions is perceived as having a major impact on the degree to which Maori have achieved.
- Difficult home environments which often involved neglect, physical and sexual abuse, heavy responsibilities including housework, cooking and looking after children, and very low expectations and put-downs from parents.
- Cost of tertiary education.
- Maori parents being unaware of the benefits of education; being unable to see past the immediate whānau financial situation; or feeling unable to provide academic support to their children.
- The failure of the system to recognise the differing needs of Maori and failure to provide courses and programmes that served those needs.
- The lack of Maori as teachers and academic role models

### Maori participation at the University of Waikato

The enrolment of Maori at the University of Waikato has steadily increased to a point where Maori comprise 22% of the total university student body. Enrolment figures on ethnicity also reflect an increasing diversity within the student population signalling a movement away from a Pakeha/European dominated population.

**Table 1**  
**Ethnicity statistics by**  
**University of Waikato student population, total NZ population,**  
**and the School of Science and Technology**

<b>Ethnicity</b>	<b>UOW<sup>1</sup></b>	<b>NZ<sup>2</sup></b>	<b>SOSAT<sup>3</sup></b>
	<b>%</b>	<b>%</b>	<b>%</b>
Pakeha/European	58	79.6	69.2
NZ Maori	22	14.5	11.8
Chinese	6	2.2	n/a <sup>4</sup>
Other Asian	4	n/a	9.6
Pacific Islander	3	5.6	2.5
Indian	1	1.2	n/a
Other	6	n/a	n/a

- These figures are derived from student enrolments as of August 1999
- These figures relate to the proportion of each ethnic group resident in New Zealand as of the 1996 Census.
- These figures are derived from student enrolments at the beginning of 1999
- Figures for these ethnic groups were not available.

Maori comprised 14.5% of the total NZ population with 41% of the Maori population resident in that area defined as the University of Waikato's catchment area. That is, the Waikato, Bay of Plenty, Gisborne, Hawkes Bay, and Taupo. The median age of Maori living in these regions is 23-26 years, inferring a high number of Maori people

eligible to attend university. It is reasonable to infer from these statistics that the Maori participation rate of 22% at the University of Waikato does not represent maximal participation by Maori. However, not all Maori in the university's catchment area will be eligible, or even want to pursue studies at university.

When participation rates in the SOSAT are examined, the Maori rate is lower (per capita) than for other ethnic groups, and does not reflect the proportion of Maori in the wider university. Jefferies (1997), in his examination of barriers experienced by Maori to education, states that:

*While the proportion of Maori enrolments at tertiary institutions reached 11.2% in 1996, several subject areas saw much lower levels of Maori representation including: engineering, 4.9%; architecture and town planning, 5.2%; natural and applied science, 6.0%; and commerce and business, 7.9%. (Jefferies, 1997, p.53).*

In 1997 approximately 8.1% of students were Maori in the SOSAT, slightly better than the national average reported by Jefferies. Currently, the academic staff of the SOSAT includes two Maori staff; one is a permanent appointment not involved in undergraduate teaching, the other is employed in the equity team. According to the Dean of the SOSAT, he comments that:

*In terms of academic staff, that's one of our main concerns. I would say it's not for want of trying, it's simply there are not enough Maori in the country with higher degrees in science and technology.... more Maori on staff is probably much more related to the Treaty than trying to involve those Maori in science [ie: using students to improve Maori participation] (Personal communication, August 20, 1999).*

Although efforts are being made to increase the number of Maori participating in science education, an equitable position is yet to be achieved, and a commitment to the Treaty of Waitangi within the SOSAT remains to be realised.

### **Social equity strategies employed by the School of Science and Technology**

In 1991 the School of Science and Technology (SOSAT) at the University of Waikato had a very low participation rate of Maori and students from other non-dominant ethnic groups. This situation was serious enough to concerned the then Dean of the School and strategies were developed to change this situation. Four major strategies are used to encourage, support and retain Maori to successfully pursue and complete a degree in Science. They are: the Te Putahi o te Manawa programme (which is essentially a mentoring programme); a scholarship and grant writing strategy (especially for FRST TPFM scholarships); school visits; and field trips with secondary schools in the Waikato region that have a high proportion of Maori students. Each strategy is described as follows.

## **Te Putahi o te Manawa programme**

*The purpose of the mentor scheme is to provide students with the opportunity to access the knowledge and experience of someone that they can relate to and that knows what the student is going through (The Staff Newsletter of the University of Waikato, 1999, p.7).*

The SOSAT established a system of mentoring for Maori students in 1995 in an effort to increase participation by Maori in science training. A full time staff member administers the system. They retrieve from the University database, the name and addresses of all students who have identified themselves as Maori when they enrolled. Each Maori student (or taura) is assigned a mentor or kaitiaki. The kaitiaki's role is to provide academic and personal support to the taura during the academic year. Each kaitiaki is assigned 6-8 taura and has confidential access to their course marks and exam results. Kaitiaki are senior Maori students, either in the final year of their undergraduate degree or doing graduate studies. Kaitiaki are academically able and are usually involved in other sporting or cultural activities. Kaitiaki are selected by the co-ordinator of the scheme and receive a nominal amount of money (\$NZ250) to recognise their contribution.

Matches between kaitiaki and taura normally last for one, two or occasionally three academic years. The scheme is somewhat unique in that older students (rather than faculty) act as mentors. The scheme is known as Te Putahi o te Manawa, which translates as "of crucial importance". In the context of Te Putahi o te Manawa, mentoring is best defined as a form of socialisation whereby a more experienced individual acts as a guide. The aim of the relationship is to develop and refine the mentee's skills and coping abilities in the tertiary environment (Moore & Ame, 1988). This is expected to result in improved retention of Maori students, and decreased completion time for Baccalaureate degrees undertaken by Maori students. Te Putahi o te Manawa also seeks to nurture taura and foster their growth and professional development as science students (Shandley, 1989) and decrease their feelings of isolation (Hawke and Morris, 1994). The mentor acts as an example to the mentee and is able to provide instruction and guidance in the university environment and explain and notify students of the institution's unwritten and often invisible rules. The co-ordinators role is to organise regular school-wide meetings (which all kaitiaki and interested students are expected to attend) and provide guidance and support to the kaitiaki and intervention in the mentor-mentee dyad if necessary.

The strategy has been in operation for four years. The physical presence of the equity office provides a space as well as one full-time and three part-time support staff to provide students with advice and guidance with regard to their academic work, and information about the availability of scholarships.

## **Scholarship Recipients within the School**

Financial support for students studying at University is essential. By successfully winning grants and scholarships, students and their families are placed under less stress to seek financial support, and students are therefore in a more favourable position to be able to devote their full attention to their studies. FRST has recognised

this need and provided TPMFs to academically able and culturally involved Maori students. These scholarships are financially generous and nationally contestable. A role played by the social equity office is to provide support, guidance and practical help to Maori students in writing applications for grants and scholarships. These activities serve to directly improve the retention of Maori students in the SOSAT. In 1999 four new Tuapapa Putaiao Maori Fellowships (TPMFs) were awarded to students within the SOSAT. This represents a 100% success rate for applications submitted from the SOSAT in the previous year. There are, in total, 11 TPMF recipients in the SOSAT. They are listed in Appendix 1 of this report.

### **School Visits**

The equity team has identified four schools throughout the Waikato region as having a high Maori pupil roll. These schools are Paeroa College, Ngaruawahia High School, Huntly College and Fairfield College. Because of their high Maori roll, the equity team has been specifically targeting these schools since 1997. The equity team works with the Heads of respective Science Departments at these schools to coordinate school visits and field trips. The school visits usually take place at the schools, while the field trips are held at the SOSAT laboratories or out in the field. Upon request from the equity team coordinator, Maori University students have also been involved in field trips. Members of the equity team distribute information to schools throughout the Waikato region, attend careers expos such as Te Ao Hou, and conduct school visits to meet each school's needs. This may include speaking to students about the types of subjects that are available for a Science degree and the variety of careers available for graduates.

### **Field Trips**

To create an interest in science among secondary school students the equity team has offered field trips for 3rd form students since 1995. After the field trip in 1998, it was felt that 3rd form students lost interest very easily and that the format for the 1999 field trip would be changed. In 1999 the equity team focussed their attention on 4th form students inviting them on an intensive field trip involving "hands on" work and assessment. Again, it is intended that this strategy will encourage Maori students to find a niche for themselves in the science field.

### **Other strategies**

Having outlined above the strategies employed by the SOSAT, it is important to also be aware that there are other strategies used by other departments within the University of Waikato to achieve similar outcomes.

The programme that the researchers are most familiar with is the Kaupapa Maori tutorial programme in Psychology. This programme operates on the basis of senior Maori students participating as sessional assistants in the delivery of formal course support offered to students (ie., tutorials and laboratory demonstrations). The sessions provided by Maori sessional assistants are designed specifically for Maori students,

and students are actively encouraged by both tutors and academic staff to attend these tutorials and demonstrations, rather than those prepared for non-Maori students. Attendance for Maori students at Maori specific tutorials or laboratory demonstrations is not mandatory and students do have a choice. In addition to support afforded through tutorials and demonstrations, tutors are employed to offer extra assistance for one-to-one and small group consultation, the focus of which is usually support for assignments and examinations. The Kaupapa Maori tutorial programme is co-ordinated by a full time tutor who also provides assistance to the Maori sessional assistants, as well as to students. The policy that has been adopted by the Department of Psychology has been included in this report in Appendix 2.

The success of this programme lies in providing support and assistance that is specifically focused on the course work that Maori students are engaged in. That the support system is linked to formal course processes means that students are in contact with their sessional assistants or demonstrators at least fortnightly, if not weekly. As a result, sessional assistants are better able to monitor the progress of students.

Having described the above, there is a major difference between the programme run by the psychology department, and that of the SOSAT. The psychology department's support programme is only available to students taking psychology courses, and not in the wider Faculty of Arts and Social Sciences, whereas the SOSAT programme serves Maori taking courses across all departments in the SOSAT. The diversity of subjects across a School is far greater than that within a department.

Given that the SOSAT equity strategies have a major focus on mentoring, the literature related to mentoring is reviewed in the following section. Mentoring is seen as distinct from role modelling in that mentors provide mentees with an ongoing professional relationship of mutual benefit. Mentoring may or may not involve emulation by the mentee, but does involve building a successful relationship. Role models, on the other hand, are often not personally known by students and may not have come into direct contact with them. Thus role modelling does not involve relationship building, but rather role models are looked up to and emulated because of their achievements.

Role modelling is a central part of the TPMFs because FRST requests that recipients involve themselves in role modelling opportunities such as school and marae visits.

## Section 2: About mentoring and role modelling

Mentoring (from the Greek for “enduring”) is a method that has been used to shape and guide the lives of younger or less experienced people for centuries. The mentor is an older, wiser, or more experienced individual who provides guidance to the younger person (the mentee). The concept of mentoring can be traced back to Homer’s epic poem the “Odyssey” where Ulysses entrusted to his friend Mentor the education and upbringing of his son, Telemachus. Mentoring has long been associated with education, business and developmental psychology (Jacobi, 1991). Daniel Levinson (1978) has described the mentoring relationship as “...one of the most complex and developmentally important a man [sic] can have in early adulthood” (p.184).

Mentoring relationships are common in medicine, the arts and many other fields of human endeavour, including preventive intervention strategies for at-risk youth (Barondess, 1997; Cross, 1997; Dubois and Neville 1997; Morzinski and Fisher, 1996; Poldre, 1994). It is also a requirement of the TPMFs that each applicant nominate a mentor from their community who can help them achieve their aspirations. The aim of this chapter is to review and summarise some of the current literature that applies to mentoring within tertiary institutions.

Despite the long-standing existence of the mentoring concept, there is no widespread acceptable definition of mentoring (Poldre, 1994). Jacobi (1991) was able to identify 15 different definitions from the published literature. The definition and expectation of mentoring schemes varies with both the institution involved and the individual combinations of mentors and mentees concerned. Within academic institutions mentoring typically describes the relationship between either a senior and a more junior staff member (Goodwin, Stevens and Bellamy, 1998; Jacobi, 1991; Morzinski and Fisher, 1996) or between staff members and students, particularly graduate students (Lark and Paul, 1998). There is an expectation that the mentor will help and direct the evolution of the mentee’s professional life by stimulating and challenging the mentee, encouraging self-realisation, fostering growth and helping the mentee to understand the situations in which they find themselves (Barondess, 1997). The mentor is expected to be knowledgeable, affirming, effective, empathetic, mature, secure, self-confident, resourceful, able to devote time to another, successful, experienced and stable, and sensitive to the mentee’s individual needs (Barondess, 1997; Blackwell, 1989; Poldre, 1994). Levinson (1978) considered the mentor an inspirational figure as they promote the realisation of the mentee’s aspirations and provide a space in which the mentee can envisage themselves realising those aspirations. This last aspect could be expected to be particularly important to Maori students who may have encountered negative expectations in the past (Hawke and Morrison, 1994).

### The Role of Mentoring

Mentoring has been viewed as having two major components: one dealing with the transfer of marketable and discipline based skills, behaviours and attitudes, and the other related to the social and emotional interactions that makes the transfer of

knowledge and skills possible (Parker-Redmond, 1990). Te Putahi o te Manawa seeks to provide a culturally appropriate environment in which these interactions occur. Mentoring may also serve to create an institutional culture that encourages and rewards knowledge sharing as opposed to knowledge hoarding (Cross, 1997). Natural mentoring may occur within Universities at an unknown rate, when two individuals grow to know and like each other. Traditional and informal mentoring relationships may develop more readily between those with pre-existing social relationships, those from similar cultural or ethnic backgrounds and those of the same gender (Morzinski and Fisher, 1996). Under-represented and culturally diverse students may have difficulty relating to majority faculty and tend to avoid them outside of class (Allen, 1981), thus planned mentoring in academic settings has been used to increase mentoring opportunities for non-dominant ethnic group students (Parker-Redmond, 1990). Mentoring differs from role modelling because the mentor is engaged in an ongoing relationship with the mentee. Whilst exposure to role models is often brief (Barondess, 1997), mentoring requires different skills from those required as teachers, role models, or friends, and there is an emphasis on individual compatibility between the dyad of the mentor and the mentee (Barondess, 1997).

Within the field of education, mentoring has also been implemented to assist graduate students and young staff members to develop professionally and has been further suggested as a strategy to improve the retention of undergraduates and enrich the quality of their learning experience (Jacobi, 1991). Mentoring has also been used as an affirmative action strategy for increasing the cultural diversity among university staff (Blackwell, 1989) and students (Abdullahi, 1992). Mentoring within educational institutions is seen as addressing several of the causes of academic attrition and delayed progress, including a lack of proper academic preparation for university, lack of knowledge about or access to social or academic resources and feelings of cultural or social isolation (Parker-Redmond, 1990). While there has been considerable enthusiasm for mentoring programmes (e.g. Barondess, 1997), few studies have produced tangible evidence of the benefits of mentoring (Tierney, Grossman, and Resch, 1995). Many of the studies to detect benefits for mentees in mentoring programmes have been from the field of education (e.g. Goodwin et al. 1998). Whilst many people claim to have had influential role models in their lives, or noted their absence (Martin, 1996, Hawke and Morrison, 1994) we could find no studies that looked at the specific effects of role modelling (rather than mentoring) on student's careers, aspirations or achievements.

### **The Benefits of Mentoring to the Mentee**

There have been many publications that have discussed the perceived benefits of mentoring (The American Association of University Professors and the National Education Association 1991; Abdullahi, 1992; Blackwell, 1989; Barondess, 1997; Cross, 1997; DuBois and Neville, 1997; Gooderson and Locke, 1995; Poldre, 1994; Ricketts-Gaskill, 1993). Increasingly, authors have evaluated the performance of mentoring systems by assessing the mentor or mentee's perception of the scheme (Goodwin et al., 1998; Merriam, 1983; Morzinski and Fisher, 1996; Jacobi, 1991). Goodwin and her colleagues (Goodwin et al., 1998) obtained faculty member's perceptions of staff mentoring in Schools, Departments and Colleges of Education in

Colorado, USA. Only 35% of faculty responded to their questionnaire, but most placed a positive value on mentoring. Voluntary and informal mentoring was generally valued more highly than involuntary or formal mentoring. Jacobi (1991) reviewed the literature on mentoring between the mid 1970's and the late 1980's in an attempt to identify whether mentoring helped students succeed in college and if so how this occurred. Jacobi concluded,

*virtually none of the research reviewed (by her) attempted to determine the frequency of mentoring using a cross-section of institutions and students (p.514, 1991).*

Thus it was difficult to determine how common mentoring was in educational institutions. Nonetheless, Jacobi concluded that mentoring for non-dominant ethnic group students was relatively rare at the undergraduate level. She was able to show that most empirical studies about mentoring and undergraduates focussed on what she called *process issues* (such as psychosocial development) rather than outcomes (such as academic success).

There are at least two ways of evaluating a mentoring plan. If the goal of mentoring is to increase the number of non-dominant ethnic group staff and/or students, an obvious measure is the amount of increase in staff/student numbers. This measure is not useful as few people outside the institution may be aware of programmes within the institution (and therefore may be attracted to the institution for other reasons) and also there may be wider social trends that impact on the institution more. A second measure is to survey those within the institution to determine how they view the mentoring programme and how it has impacted them with respect to behaviour change, retention and career development (Morzinski and Fisher, 1996).

Erkut and Mokros (1984) suggested from a survey of 723 students at six different universities that the mentor relationships were by-products of academic success rather than causes of high achievement. Jacobi (1991) concluded that direct support for the hypothesis that mentoring supports academic success was largely missing, but that there was indirect support, since mentoring had been shown to be associated with success in business organisations and contact with faculty had been shown to improve performance by students. Cosgrove (1986) randomly assigned students to a mentor or no-mentor situation and conducted both cross-sectional and longitudinal comparisons. Cosgrove's results indicated that students who participated in the mentoring programme were more satisfied with the University environment and showed greater developmental gains than the control group. Cosgrove did not specifically investigate academic success. In the study of Goodwin and her colleagues, 25% of people who had been mentored listed scholarly activities and accomplishments (publications, research projects or grants) as the main outcome of their mentoring relationship (Goodwin et al, 1991). Other outcomes reported by Goodwin et al included increased confidence, feelings of belonging, being supported, and developing close friendships.

Gender and ethnicity are important issues in the self-selection of mentors, with people apparently selecting mentors of the same gender and ethnicity as themselves (Erkut & Mokros, 1984; Dreher & Cox, 1996). Goodwin et al. (1998) found no statistically significant differences between men and women in their attitude to mentoring.



Although we could find no empirical studies on the benefits of role modelling we suggest the benefits are likely to include: “putting a real face to the dream” (Hawke and Morrison, 1994); providing inspiration and direction when making training and career decisions (Martin, 1996); and providing motivation and encouragement when the going is tough.

## **Mentoring Strategies**

The American Association of University Professors and the National Education Association (1991) (AAUP & NEA) considered that circumstances that tended to marginalise education and minimise involvement in learning, especially impacted on non-dominant ethnic group students. These included an excessive reliance on part-time staff, part-time students, and large classes. They further considered that special attention needed to be applied to the mentoring needs of non-dominant ethnic group students because of the inadequate numbers of non-dominant ethnic group faculty to act as mentors and role models and the presence of a *prove yourself first* attitude, which discourages many students in their early stages, particularly if they have had to “prove themselves” every step of the way (Hawke and Morrison, 1994). Abdullahi (1992) described the continuing under-representation of non-dominant ethnic group students in library science as “*one of the most pressing problems the library profession is facing today*”(p.308). The lack of Maori participating in science training in New Zealand could be regarded in the same way. Abdullahi suggested that the way to increase the pool of non-white librarians in North America was to establish a recruitment action plan, which has short and long-term goals, and develop an effective awareness program which explains opportunities for minorities at library schools. These actions were to be followed by a funding programme and support services to aid in student retention. Mentoring was specifically identified as a way of providing support to non-dominant ethnic group students. Abdullahi (1992) went on to suggest that goals for mentors should include: 1) Offering practical advice about problems of management and instruction; 2) offering good guidance and constructive criticism; 3) being understanding; 4) providing emotional support; 5) being accessible, interested, and willing to help; and 6) being patient.

More locally, the New Zealand FRST has approached the issue of Maori non-representation in science by funding generous graduate scholarships (we note that awareness among the non-scientific community may still be an issue) and The University of Waikato has approached it by establishing the equity office and all they represent (which is also probably poorly known outside the institution). There is no national strategy for increasing Maori participation in science.

### Section 3: Evaluation aims

It is important to point out that the strategies instituted in the SOSAT have only been in operation since 1995, with changes being implemented in 1997, and 1999 according to how programme organisers viewed the progress and effectiveness of their strategies. Furthermore, since 1991, the number of Maori students in the SOSAT has risen dramatically from 68 to 165. This change may reflect a simple demographic flow evident in the overall increase of Maori students across the University as a whole. It might also be attributable, in part, to those social equity strategies implemented in the SOSAT.

Given this, evaluating for effectiveness must be viewed within the context of what seems to be a natural increase in the number of Maori attending university, and the implementation of social equity strategies that are still relatively new and developing. Because of this we elected to survey those students and staff involved in Te Putahi o te Manawa for their views on the scheme and the impacts it has had on them.

Overall, in this evaluation we aim to determine the effectiveness of the social equity strategies for Maori students in the SOSAT. The specific aims of the evaluation are to:

- i. to determine the extent to which social equity strategies within the SOSAT are having the intended effect
- ii. to determine which of the strategies are working most effectively; and
- iii. to highlight the barriers to the mentoring programme (for students)
- iv. to identify improvements that can be made.
- v. to determine the effect of positive role modelling on career choice

The Maori & Psychology Research Unit (MPRU) was contracted by the Equity Office of the SOSAT to conduct this evaluation. The MPRU is based in the Psychology Department of the University of Waikato.

The groups identified as being impacted by this evaluation are the:

- i. Social Equity Office
- ii. Foundation of Research and Science Technology
- iii. Maori students of the SOSAT
- iv. School of Science and Technology staff
- v. Secondary School Science teachers

#### Ethical concerns

A proposal for research was submitted and approved by the research committee of the Department of Psychology at the University of Waikato. The Code of Ethics of the New Zealand Psychological Society guided the ethical practice of those who carried out this evaluation. All participants, other than those who completed questionnaires, were provided with information sheets about the evaluation and were asked to sign consent forms. Those who completed questionnaires were provided with written

information about the evaluation at the beginning of the questionnaire form. If a questionnaire was completed, consent to use the information was assumed to have been given.

The procedures used to gather information, the people that were involved, and how the data was analysed, is presented in the next section.

## Section 4: Method

As pointed out in the literature review, there are at least two ways of evaluating a mentoring plan (Morzinski and Fisher, 1996). Firstly, as one of the goals of the SOSAT equity strategies is to increase the number of Maori students, an examination of the number of Maori enrolments and retention by the SOSAT may indicate a positive effect. This approach makes it difficult to separate the SOSAT initiatives from other demographic and social factors operating and may lead to misleading conclusions. A second way to evaluate the social equity strategies is to examine how the social equity strategies have impacted on Maori within the SOSAT, and on Maori school leavers, with respect to behaviour change, retention and career development (Morzinski and Fisher, 1996). Bearing these points in mind, we have employed a variety of data gathering procedures and sought both complementary quantitative and qualitative data. Evaluation tasks are described below.

### Evaluation tasks

*Collation of statistical data of Maori students enrolled at Waikato University, undertaking a science degree to identify recruitment, retention and completion patterns.*

The data was gathered to identify any relevant trends that might indicate the behaviour and performance of Maori students pursuing science degrees. Specifically, data relating to enrolment numbers, retention rates and completion times of existing Maori students was collected from the SOSAT data bases and official university records. A SOSAT Social Equity Officer accessed and made summaries of the data available to us (attached in Appendix 3). From these summaries, we highlighted patterns of interest to this evaluation.

*Collation of ethnicity and gender data for all students in the SOSAT from 1993 – 1999 to identify patterns related to the recruitment, retention and completion of ethnic/gender groups.*

In an attempt to assess the performance of the SOSAT equity strategies we collected data on enrolment numbers, retention rates and completion time for Maori students. As well as this the growth in the number of Maori students and students from other ethnic groups was collected. We divided this data to provide information for both men and women. In our analysis we highlight trends apparent in the data, particularly if rates of enrolment or retention were proportionately more favourable for Maori than for other groups. If this was the case, then it might suggest that equity strategies employed by the SOSAT may be having a positive effect. Data summaries that were provided by the SOSAT Social Equity Office can be found in Appendix 3.

*Carry out key informant interviews, focus group interviews and questionnaire surveys with members of the stakeholder groups.*

Details of key informant interviews, focus group interviews and questionnaire surveys are described below, according to each participating group.

## **Participants and procedures**

### **Maori undergraduate students in the SOSAT**

There were 124 Maori undergraduate students in the SOSAT in 1999. With the assistance of the equity team, each was provided with a survey for completion. Questionnaires were distributed during student tutorials or laboratories or by mail. Students were asked to take the questionnaires away, and to complete and return them anonymously to the social equity office in the SOSAT. Fifty-six students responded to the survey - representing a relatively good response rate of 45%.

Through the questionnaire we sought information from Maori undergraduate students regarding the support systems of the SOSAT, particularly Te Putahi o te Manawa (the mentoring programme). We also sought information about student interest in science; their career options; possible effects of the secondary school field trips or visits they may have been involved in at high school; the impact of role models; and any potential barriers they perceived for Maori pursuing a tertiary education. The questionnaire was developed in consultation with the equity team and Dr Jim McMillan of FRST, to elicit both quantitative and qualitative data. A list of questions used in the schedule is included in Appendix 4.

Quantitative data collected through the questionnaires was tabulated and frequencies calculated where relevant. Given the small data set, further analysis was not possible. Qualitative data for relevant items were organised thematically according to the content of responses.

### **Kaitiaki**

Focus group interviews were conducted with kaitiaki from Te Putahi o te Manawa (mentoring programme) and with recipients of a Tuapapa Putaiao Maori Fellowship. The Fellowship recipients are Maori science graduate students enrolled in Masters or Doctoral programmes. Many of the recipients are also kaitiaki for the mentoring programme. The purpose of the focus group interviews was to document the kaitiaki's point of view regarding the development and process of the mentoring scheme. In addition to this we sought Fellowship holders' views about the fellowship programme, their role as a fellow, obligations to the Foundation for Research, Science and Technology and to their Maori communities and iwi.

The question schedule (see Appendix 5) for the Kaitiaki and Fellowship students was developed in collaboration with Gary Bramley of the Social Equity Team, and Dr Jim McMillan of the FRST.

Two focus group interviews were arranged. Each interview was two hours in length. Ten kaitiaki in total attended the interviews. Of the 10 kaitiaki, 5 were Fellowship recipients. Gary Bramley attended both interviews as a support person and to clarify the purpose of the interviews. Consent forms were distributed to all participants explaining the purpose of the research and their involvement as kaitiaki. Issues of confidentiality, anonymity and ethical approval were part of this process. Two researchers were involved in the interviewing, one as the facilitator and one as note taker. The session was also recorded on tape.

On completion of the interviews, the notes that were taken were supplemented and expanded by verbatim quotes to produce a focus group summary. Data analysis involved analysing the resulting summary for repetitive themes or issues, which are reported in findings section.

### Dean of the School of Science and Technology (SOSAT)

An open-ended interview was conducted with the Dean of the SOSAT to document his perspective on the support strategies for Maori students, the funding of these strategies and the value of the Tuapapa Putaiao Maori Fellowship scheme. The interview took place in the Dean's office at the SOSAT. Also present was the pro-Dean (Undergraduate) of the SOSAT. The discussion focussed around the following questions:

- Describe how support systems have been set up for Maori students
- How are the support strategies within the School of Science funded?
- What do you feel is the value of the Tuapapa Putaiao Fellowship Scheme?

The interview was approximately one hour and was recorded on tape. The responses made by the Dean have been reported progressively through this report where his comments help to elaborate or explain a position, issue, recommendation, or resulting theme.

### Heads of Science Departments of four secondary schools

The Heads of Science Departments (HODs) from all four secondary schools targeted by the SOSAT equity team were asked to participate in the research. This was achieved with the assistance of the SOSAT equity team who were in regular contact with this group. Open-ended interviews were completed with four HODs at their respective schools, during school hours. The interview times ranged from 30 minutes to one hour. The interviews were loosely focussed around the following questions:

- Why do you feel students choose science as a subject?

- What are some of the barriers for students who choose science?
- How do you encourage students to go to University?
- What are your qualifications?
- What is your particular area of interest?
- What was your path to becoming a science teacher?

A number of issues regarding Maori students and science as a subject were examined with this group. These issues related to Maori students choosing science at school, barriers to doing science at school and encouraging Maori to university.

Data analysis involved examining the transcript of each HOD interview, and comparing the content of each for similarities and differences in material gathered.

### **Secondary School Students**

Students involved in field trips were asked to complete a questionnaire survey (see Appendix 6. The questions were designed to gather information about the students' views on influences and barriers to choosing science at school and university. A member of the social equity team distributed the questionnaires during a field trip follow-up session, approximately one month after the original field trips. Only two of the four schools that took part in the field trips completed the surveys. Although our original intention was to involve all four schools in the surveys this was not possible because: a) one school did not believe it could not facilitate a follow-up session and b) another school failed to respond to follow-up requests. A total of 39 students, of both sexes, returned questionnaires.

### **Reporting of findings**

The findings are organised and reported in the four sections that follow. Firstly, we report data relating to enrolments of students in the SOSAT, and their retention. The experiences of Maori undergraduate science students as they were gathered through questionnaire surveys are reported in section 7. In section 8 we present those findings as they relate to the Te Putahi o te Manawa mentoring programme, and the position of the Tuapapa Putaiao Maori Fellowship holders. Finally we present the information gained from Heads of Science Departments of four secondary schools. This information is supplemented by that gathered from Maori secondary school students who participated in field trips or visits by the Social equity team of the SOSAT. In this way, we provide contextual information to better understand some of the statistical trends apparent in Section 5.

Information provided by key informants such as the Dean of SOSAT, and by the Social Equity Officer, are integrated into both the introduction of this report and the findings.



## **Section 5: Enrolment and retention patterns in the School of Science and Technology**

The information presented in this section is based on that provided by the SOSAT equity team. Summaries of the statistical data relating to Maori students enrolled at the University of Waikato undertaking a science degree, as well as ethnicity and gender data for all students in the SOSAT have been included in Appendix 3 of this report. Unfortunately, we did not have access to student files or their raw data and this has limited the extent of our analysis. However, the material that we had suggests some trends that are worth commenting on.

### **General trends**

The total number of students enrolled in SOSAT has remained relatively constant since 1993, with student numbers fluctuating between 1227 (in 1994) and 1454 (in 1997). Overall, the rise and fall in the number of European students has mirrored the total number of students in the school during that time. The number of Maori students has increased over the period, with Maori students being 7.0% of the SOSAT student population in 1993 and 11.8% in the first semester of 1999 reflecting a growth rate of 0.8% per annum. The number of students who identify as Asian has also increased since 1990, with Asian students making up 9.6% of students in 1999, up from 5.1% in 1993 (0.75% per annum). Pacific Island students made up 1.5% of all students in 1993, and make up 2.5% of students in 1999 (a growth rate of 0.2% per annum). The proportion of European students in SOSAT has dropped from 79.1% in 1993 to 69.2% in 1999.

### **Statistical highlights - 1998**

Pertinent statistics for 1998 are reported in bullet point form in Text Box no. 1. At this time the data are perhaps best described as a 'snap shot' reflective of how Maori students were positioned within the SOSAT at the end of 1998. For that reason this information presents a useful baseline against which the significance of changes or patterns that may emerge in the future can be measured.

**Text Box no. 1****Enrolment and retention patterns of Maori students in the School of Science and Technology for 1998**

- i. In 1998, 161 Maori students enrolled in the SOSAT, 132 for their first degree, 20 as graduate or post-graduate students and nine for Certificates of Proficiency or Post-graduate Diplomas. There were 64 new Maori students.
- ii. 132 Maori undergraduate students enrolled for a total of 860 courses and completed 686 of them.
- iii. These students passed 590 (86%) of the courses they completed.
- iv. 57 students (43.2%) passed all courses they enrolled for
- v. 12 students (9.1%) failed one course
- vi. 37 students (28%) failed two or more papers.
- vii. 17 students failed to complete a course (12.9%, gaining an IC grade)
- viii. 38 students (28.8%) gained more than one IC grade 1.
- ix. 38 students (28.8%) were ineligible for re-entry because they failed more than half of their courses. Of those, seven were allowed to re-enter the school.
- x. 13 undergraduate students completed their degrees in 1998.
- xi. A further five students completed the requirements for their MSc. degrees in early 1999 and will be graduating shortly
- xii. The SOSAT first Maori PhD graduates are awaiting their oral examinations.
- xiii. In 1998 one student completed a DipAppSci and the student working towards an MPhil is continuing.

Despite the increased number of Maori students majoring in science subjects, it is concerning that a large number failed to gain passing grades in more than half their courses. This makes them ineligible to return to study. In addition, many gained an IC grade because they had not completed all the requirements of a course. This also contributes to some students becoming ineligible for re-entry to the school. Those who fail courses, yet are still eligible for re-entry, contribute to longer completion times overall as they are required to repeat courses. Issues related to retention are further discussed below.

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<sup>1</sup> Note that some students are included as having failed more than one course and as having gained more than one IC grade. For example a student may have gained 3 IC grades and failed 3 courses. Such a student was counted twice - once in each category. As a result, the percentages when taken together may total more than 100%.

## Statistical highlights - 1999

### Text Box no. 2

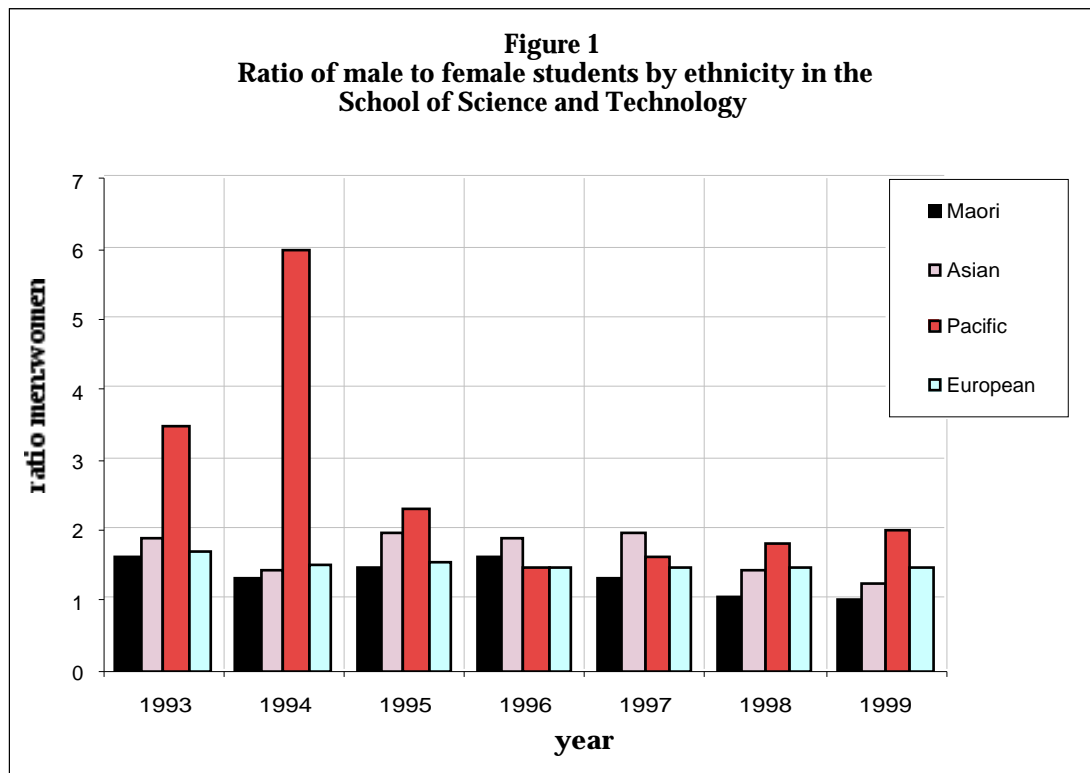
#### Enrolment and retention patterns of Maori students in the School of Science and Technology for the first semester of 1999

- 156 Maori students enrolled in the SOSAT in the first semester of 1999 (up from 153 in the first semester of 1998). 124 of these were undergraduates. There were 49 new Maori students.
- Undergraduate students - second year or above, were spread across the school with majors in Biology (26), Chemistry (13), Earth Science (20) and Physics (3). They were pursuing the following degrees: BSc (82), BSc(Tech) (37), BTech degree (3) and BLibS (2).
- The 26 graduate students (MSc, PhD) were majoring in: Biology (8), Chemistry (4), Earth Science (5), Physics (3), Technology (5) and Education (CSMTER) (1). 14 were studying for a MSc., 5 for MSc (Tech) and 7 for PhDs. There is one Maori MPhil student and 6 others working towards postgraduate Diplomas.
- 12 students are expected to complete the requirements for their BSc or BSc (Tech) degree in 1999.
- 7 students are in the final year of their MSc or MSc (Tech).

In the first semester of 1999, there was a 10.3% reduction overall, in new enrolments to the school. For Maori, there was a 23% reduction between 1998 and 1999. As second semester enrolments were not available to us at the time of writing this report, we are unable to determine whether the reduction in new enrolments will hold true over the second semester, and the year generally.

## Gender

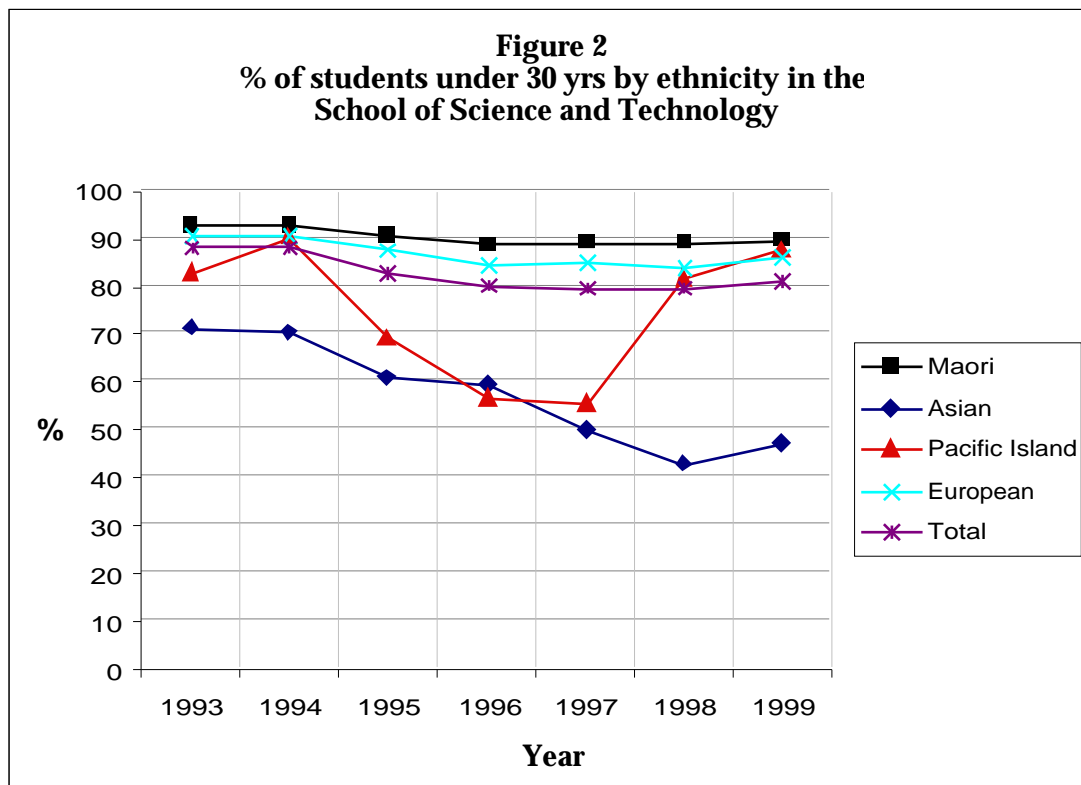
More males than females have been enrolled in the school in most years since 1993, as shown in Figure 1 below. Generally the ratio of men to women has progressively decreased over the period examined (1993-99) but clearly women could be better represented in the school's student body. For all groups except Maori, the ratio of men to women is greater than 1:1, but less than 1:2 (except for Pacific Island students, where the ratio is 1:2). Note that where there is a low number of students from a particular ethnic group, the ratio of men to women is likely to be distorted because of the smaller numbers involved.



## Age

Since 1993, the percentage of all students aged below 30 years old has steadily reduced from 88.6% to around 82% reflecting a steady increase in students over 30 years old in the SOSAT. The trend follows a similar pattern for all ethnic groups except Asians, where most students are aged between 31 and 40 years (see Figure 2 over page).

The number of mature students (over 30 years old) in the school has been stable for European students, but slowly increasing since 1993 for other ethnic groups. The number of Maori and Pacific Island students in the 21-30 age group has increased markedly during this time. There are currently more mature aged Asian students than there are younger Asian students, with the number of students in the 31-40 age group accounting for most of the increase. It may be that many of these students are enrolled for higher degrees.



## Retention

There were 125 Maori undergraduates in the SOSAT in 1998. Of those, 13 have now graduated with 7 choosing to re-enrol for further studies at the graduate level. There were 31 Maori students who are no longer studying science because they either failed to complete work (for whatever reason), or failed to gain sufficient grades to allow them to continue. Data collected from those Maori undergraduate students in science who knew people who had 'dropped out' is reported in later sections and serves to illuminate this result further. However, that 25% of Maori students who initially set out pursue a degree in science fail to complete is a result that justifies continuation of equity and retention strategies.

## Completion times

Of 13 students that completed their Bachelors degree in 1998, six had taken four years to complete a BSc. Four students completed their BSc within the prescribed three years and one took five years to complete a BSc. This student had been ineligible to return once, but was allowed back into the school. Both BSc(Tech) students had completed their studies within the prescribed four years. Four students (all of whom took four years to complete their BSc) entered the SOSAT from Te Timatanga Hou in 1995. All five MSc/MSc (Tech) students completed within the recommended time.

## Section summary

The number of Maori students enrolled in science courses has persistently increased since 1993, whilst the overall number of student enrolments has remained relatively

constant. Contrasted with the increases in the participation of other minority ethnic groups in the SOSAT, the Maori rate of increase appears to be slightly greater suggesting that the social equity strategies employed by the SOSAT may be having some effect beyond those that might be attributed to demographic changes.

Additional support for this effect is the high number of younger Maori students in the SOSAT. To some extent this might be due to social equity strategies aimed at school leavers, however, we need to bear in mind that the Maori population, overall, is a youthful one and the potential trend evident here may be indicative of such youthfulness. The extent of the effect contributed by social equity strategies may never be determined.

In the first semester of 1999, Maori students accounted for 11.8% of enrolments in the SOSAT. Based on the ethnic composition of the SOSAT, measured against the overall ethnic composition of the University student population, a continued effort to recruit and retain Maori students is required. Although the participation of students of Pacific Island descent seems small (2.5%) when contrasted against the proportion that they form of the greater university population (3%), their participation rate appears reasonable. However, when viewed in light of their composing 5.6% of the overall New Zealand population, the SOSAT, and the University as a whole has some way to go if it is to reflect these proportions.

For Maori, the ratio of male to female students is about 1:1 and it would seem that parity has been achieved, although an on-going effort would be required to maintain this level. This situation is not true for other ethnic groups in the SOSAT and targeted strategies for European, Pacific Island and Asian women may be in order.

Since 1993, there has been a steady increase in mature aged students participating in the SOSAT. However, there are far more mature aged students (31-40 years old) of Asian ethnicity, than any other ethnic group. Given the data that we have, we can only suggest that the difference between ethnic groups may be attributable to there being more Asian students enrolled in higher degrees. Additionally, it might be indicative of students in other ethnic groups going elsewhere to complete higher degrees.

Some Maori students are doing well in pursuit of their science degrees, some however are not. The high failure rate, and the resulting number of students who become ineligible for re-entry, is cause for concern. The investments in recruitment strategies that seem to be having an effect are counter-acted by what seems to be a reduced ability to retain students. Those that are retained, take longer to complete, indicative of students having to repeat courses.

Cause for celebration is the extent to which the social equity team in their work with Maori students in the SOSAT have successfully competed for Tuapapa Putaiao Maori Fellowships provided by the Foundation for Research, Science and Technology.

## Section 6: The experience of Maori Undergraduate Science Students

A questionnaire was distributed to the 124 Maori undergraduates in the SOSAT. Fifty-six (45%) students responded to the survey. The findings are reported below and follow the order of questions presented in the questionnaire.

### Organising for a career in science

*Q1. What or who helped you choose science as a subject?*

Q1. n=56	n	%
Interest (personal/career)	46	82%
Teacher	17	30%
Parent(s)	10	18%
Other	7	13%
Mentor	4	7%
Friends	3	5%

Note that the respondents had the choice of selecting more than one option. The majority of respondents (82%) elected to pursue Science at university out of “interest (personal/career)”. Teachers were influential for 30% of respondents. Parents, other people or sources, mentors, and friends were less influential.

*Question 2. Was science a part of your career options before you chose to study it at University?*

Q.2 n= 56		%
Yes	41	73%
No	10	18%
Unsure	5	9%

Most respondents (73%) indicated that science had been a significant part of their career plans before studying at University indicating a proactive approach science.

*Question 3. Do you think science offers you an immediate career opportunity?*

Q.3 n= 56		%
Yes	34	61%
No	5	9%
Unsure	17	30%

Although most students surveyed believe that science does offer an immediate career opportunity some thought otherwise (9%), or were undecided (30%).

*Question 4. Why do you think science does not offer an immediate career opportunity?*

When asked why science does not offer an immediate career opportunity, one respondent suggested that practical experience is much more valuable than a degree by itself.

*I believe that a degree is best if it is accomplished by skills in the field.  
Without experience a degree isn't very effective, science or otherwise.*

Another commented:

*Because you have a degree doesn't mean you can get a job immediately.  
Though it does increase your chances.*

Lastly, one respondent was sceptical of a career in science, claiming that “science funding is very insecure”.

*Question 5. Do you think science was effectively promoted as a viable career option for Maori students? a) at secondary level, b) at tertiary level*

Q.5 n= 55					
Sec School n= 55			Tertiary n= 53		
Yes	21	38%	Yes	37	70%
No	34	61%	No	16	29%

Of the 55 respondents to this question, 61% thought science lacked effective promotion for Maori students at the secondary level. At the tertiary level, 70% of the 53 respondents believe science is effectively promoted to Maori students. The responses indicate a lacklustre performance by secondary schools in the promotion of science as a viable career option to Maori students.

*Question 6. What made you choose your present programme of study?*

Q.6 n= 56	n	%
Personal Interest	38	68%
Career Option	28	50%
Perceived teacher as being good	15	27%
Other	5	9%
Appropriate role model	3	5%
School Visits	2	4%
Field Trip	1	2%

The respondents had the choice of selecting more than one option. When asked to indicate why students choose their present programme of study, “personal interest” accounted for 68% of their responses (respondents could choose more than one category). Having a specific career and studying science as a result represented 50% of the responses, while 27% indicated that a teacher and/or lecturer had influenced their selection of programme. “Other” comments regarded scholarship incentives and



discussions with the Dean of SOSAT as influential. The effect of role models, field trips and SOSAT school visits did not seem very influential.

*Question 7. Does the School of Science make it easy to select subjects?*

Q.7 n= 56		%
Yes	32	57%
No	9	16%
Unsure	15	26%

More than half (57%) of the respondents suggested the SOSAT made selecting subjects fairly easy. However, 26% were “unsure” and 16% did not agree. In total 43% remain unconvinced about the ease of the selection processes.

According to respondents, the foremost reason for the SOSAT making it easy to select subjects, related to a comprehensive package of booklets, pamphlets and easy and accessible SOSAT information, outlining course/programme details. This material was highly regarded as it allowed for “informed decisions”, and providing “a broad perspective of various subjects”. In addition the presentation and clarity of material ensured easy reading. The assistance and consultation from tutors, lecturers, and SOSAT staff was highly commended by respondents, and viewed as reassuring and supportive.

The major difficulty in selecting subjects related to timetabling. Students felt that their options were limited as a result. Some respondents felt that they were forced to select courses that were not their first choices, in order to complete their degree structure. A relatively small number of students were concerned with the lack of options from other schools of study that compliment their science degree.

### **Assistance from Te Putahi o te Manawa mentoring programme**

*Question 8. Do you know you have been allocated a mentor?*

Q.8 n= 54		%
Yes	47	87%
No	7	13%

Of the 54 students who responded to this question, 87% were aware of being allocated a mentor, suggesting that mentors or kaitiaki have been effective in contacting the Maori students of the SOSAT and informing them of the programme and their role as kaitiaki. However, 7 of the 54 respondents did not know they had been allocated a mentor.

*Question 9. Do you know who your mentor is?*

Q.9 n= 54		%
Yes	41	76%
No	13	24%

Of the 54 respondents who knew that a kaitiaki had been assigned to them, only 41 were able to identify them. Almost one quarter (24%) of the sample, did not know who their kaitiaki was suggesting a need for increased communication between kaitiaki and student.

*Question 9.1 If so, have you contacted them?*

Q. 9.1 n= 53		%
Yes	15	28%
No	38	72%

When asked if they had contacted their mentor, 72% of respondents had not.

*Question 9.2 If you have contacted your mentor, has it been helpful?*

Q. 9.2 n= 53		%
Yes	15	28%
No	0	0%
N/A	38	72%

Of those students who had been in contact with their mentor (28%), all reported that the contact had been helpful.

*Question 9.3 If you have not contacted your mentor, why not?*

That 72% of this sample had not contacted their mentor is puzzling. The explanations provided by students were mixed and varied. Most of the respondents reported that help from kaitiaki was unnecessary at the time of the questionnaire. Many of these respondents saw no reason to contact their kaitiaki as they suggest they have little trouble in coping with the workload. Nonetheless there were some students keen for support but uncomfortable in approaching their mentor. These students admit to being anxious over 'not knowing' their kaitiaki and feeling 'inadequate' in front of peers.

Respondents who are yet to contact kaitiaki have reported either losing their initial letter and contact numbers, or have not realised that they have been allocated a kaitiaki. Seventy two percent of this sample is a large number of students to be under-utilising the programme services.

*Question 10. Did you recognise the students that visited your school as Tuapapa Putaiao Maori Fellowship students?*

Q. 10 n= 56		%
Yes	3	5%
No	9	16%
N/A	44	79%

This question sought to determine the influence of TPM fellows on potential science students. Most of the respondents regarded this question as either not applicable to them (79%) or provided a 'no' response (16%). Only 5% of students recognised that they had met TPM fellows. At face value this suggests that respondents had not attended school at the time the TPM fellows visited, or they had left school before the TPMF scheme began. It also suggests that where respondents were at a school attended by a TPM fellow, that it was not clear to the students that those making the visit were TPM fellows. Having suggested these explanations, we also need to point out that the TPMF scheme has been in operation for only four years, and that the numbers of school visits that have been made to date are few.

### Other sources of help for students

*Question 11. Who has helped you, or offered to help you in your first year of study?*

Q.11 n= 56		%
Kaitiaki	23	41%
Tutors	8	14%
Lecturers	8	14%
Friends	8	14%
Nobody	4	7%
Family	3	5%
TLDU	1	2%
Disabilities Officer	1	2%
Dean of Science	1	2%
Iwi	1	2%

For this sample, the most frequently indicated sources where support and help had been given or offered during their first year of study in SOSAT were kaitiaki (41%), tutors (14%) and lecturers (14%). Friends (14%) and Family (5%) were mentioned less frequently, but were also considered sources of support. A small number of those surveyed (7%) indicated that nobody had helped (or offered to help) them during their first year. Without qualitative data, it is difficult to explain this response.

*Question 12. What help have you found valuable?*

The respondents answered this question by listing the sources of help afforded by the SOSAT that they found valuable. Their responses were varied. High value was placed on that help afforded by SOSAT tutors through tutorials, laboratory demonstrations and help-tutorials. Closeness in age, as well as the experience of tutors seemed to be integral to the activities and the perception that tutors were effective.

Help from kaitiaki was seen as valuable and students had high praise for the help that they had received. SOSAT booklets and brochures were of value as were help from lecturers and peers.

*Question 13. What other help, if any, would have been valuable?*

In question 12, students placed high value on the help they received through tutorials, laboratory demonstrations and help-tutorials. When asked about other help that would have been valuable to them, students echoed their previously indicated opinions. When asked about help they would find valuable, they indicated a need for more tutorials, and greater input and interaction between lecturers and students (particularly first year students).

*Question 14. What help was of no use to you?*

Q.14 n=56		%
Responded	14	35%
Did not respond	39	70%
Not Applicable	3	5%

Most students in this sample did not perceive a need to respond to this item (75%) and those who did respond (35%) indicated that they had been yet to receive help from the SOSAT that was of no use.

*Question 15. What has (or had) helped you during your first year in science?*

Q.15 n=56		%
Lecturing Staff	36	64%
Scholarship	23	41%
Kaitiaki	18	32%
Appropriate Role Models	10	18%
Number of Maori students	5	9%
Maori tutorials	4	7%
Other	14	25%
No Responses	5	9%

This question required a qualitative response. Student responses were analysed according to content and have been presented in the above table according to the frequency of themes resulting. The list of responses are categorised in the table as sources of help (in addition to those previously mentioned) during a students first year of study in the SOSAT.

Consistent with the value that respondents have placed on formal support afforded by the SOSAT (tutorials, laboratory demonstrations and help-tutorials), staff were the most frequently indicated source of help (64%) and were frequently listed specifically in the "Other" option, along with family and friends (25%). Financial assistance through scholarships was also valued (23%). Help afforded by a "mentor" was also frequently indicated as useful (32%), however, this category potentially confuses responses as the difference between mentor and kaitiaki, although implicit in the use of terms, it is inadequately clear.

Only 9% considered the "high number of Maori students" in the SOSAT as being of assistance to them, and 7% believed "Maori tutorials" to be of value.

Students (25%) mentioned a number of other sources of support to them during their first year of study. This included help afforded through tutorials, demonstrations, family and friends. One student's comment suggested that working hard was the key.

*Question 16. Are there any solutions to making year one in science easier?*

According to Maori students, asking for help is a dilemma. A number of comments highlighted the need to foster and encourage first year students, in particular to feel comfortable about seeking help. Students in this sample indicated that seeking assistance from lecturers, kaitiaki, tutors and other support people was difficult their major indicated barriers being shyness and feelings of discomfort. According to respondents, kaitiaki need to involve themselves with their students to overcome this barrier and to encourage an environment where help seeking is expected, promoted and rewarded.

Further ideas suggested to make first year courses offered in the SOSAT more positive were to foster peer relationships through encouraging group work and a sense of collegiality. Such a strategy was seen by students to expand support networks and to potentially increase the accessible pool of resources available to them.

Further solutions to making year 1 science easier include better communication throughout the SOSAT. Students want some consistency in advice and service from all departments.

In a more reflective vein, students commented that their first year experience would have been easier if their own time-management and motivational skills to maintain a consistent and continuous workload were more developed.

*Question 17. Have you had friends drop out of science courses?*

Q.17 n= 53		%
Yes	31	58%
No	21	40%
N/A	1	2%

Of the 95% of the sample that responded to this question, more than half (58%) indicated that they had friends who had dropped out of the SOSAT. Their explanations for this vary. The most frequently mentioned reason was: science is "too hard". Other explanations include: inability to understand course material; students failing to seek help early; lack of time management skills; and outside commitments (eg., work, family).

Given the explanations provided by respondents as to why students have dropped out, it would seem that a more proactive mentoring programme might circumvent such an outcome. The establishment of a consistent and productive mentoring relationship, coupled with workshops about mastering the key skills required of students may go some way in improving the retention of Maori students in the SOSAT.

*Question 18. What do you perceive as a potential barrier to Maori students attending tertiary institutions?*

Question 18. = 56 (100%)	Total 100%
Perception of University i.e. for 'brainy' people	46 82%
Finance	39 70%
No role models	26 46%
Other	17 30%
Culture	8 14%
Location	8 14%

The respondents had the choice of selecting more than one option. The most frequently cited potential barrier to attending university was the perception that university was a place for 'brainy' people (82% of respondents). The second most frequently indicated category was financial (70%). A lack of role models (46%) also appeared to impact on Maori students' perceptions in attending a tertiary institution.

Some respondents (30%) cited other barriers to Maori attending tertiary institutions, which included a lack of family support, lack of encouragement, secondary school background, low self-esteem/confidence, and the under valuing of education.

The culture and location of tertiary institutions were also regarded as barriers.

*Question 19. Would you have chosen to attend university without having the school visits, field trips, and other information from the School of Science students?*

Q.19 n= 55		%
Yes	40	73%
No	6	11%
Unsure	9	16%

It would seem that University was always part of the career aspirations of those students surveyed. Seventy-three percent suggested that they would have still attended university without exposure to the recruitment activities of the SOSAT. However, for others (11%) these recruitment activities did have an effect.

*Question 20. If yes, would your choice of study have been in science?*

Q.20 n=48		%
Yes	33	69%
No	1	2%
Unsure	14	29%

For those students who indicated that they would have still chosen to attend university without being exposed to recruitment activities by the SOSAT, they were asked to further indicate whether they would have still chosen to pursue science. Of those who responded to this question (n=48), 69% indicated that science was still their preferred option of study. Only 1 student stated they would not have chosen a science degree.

A small proportion (39%) of respondents were undecided as to whether they would have chosen science without the assistance of the SOSAT interventions. No further data was available to explain their response.

### **Section summary**

Respondents tended to choose a science degree out of personal interest, and seemed to be pro-active in their approach because they had specifically planned a science career prior to coming to university. Most felt that science was not effectively promoted as a career option for Maori at the secondary level, although it was at the tertiary level. For about half of the respondents the comprehensive documentation provided by SOSAT made selecting subjects in science fairly easy, although timetabling constraints often narrowed choices.

Students show a clear understanding of Te Putahi o te Manawa mentoring programme and acknowledge the programme's initiative and role within the SOSAT. Help from kaitiaki was seen as valuable and 32% of respondents had been helped by their kaitiaki in their first year of study. Kaitiaki were more recognised as a source of support for Maori students (41%) than either lecturers or tutors (14% each). However, the potential of the programme has yet to be fully realised because the services appear to be under-utilised (Only 28% of students report contacting their kaitiaki in the first semester of 1999). From the information provided in this study, mainstream SOSAT support systems (tutorials, laboratory demonstration and help-shops) appear to be used more frequently than mentoring services, since students are not adequately connected with kaitiaki. Nonetheless, kaitiaki are considered the most active when it comes to offering students support. Clearly there is a need for programme organisers to be far more pro-active in facilitating contact between kaitiaki and students.

Other issues worth considering relate to requests for increased tutorial sessions and tutors, as well as greater interaction between students and lecturers. Student optimism over immediate science career opportunities is apparent, reflecting an effective promotion of science to Maori students. There is concern however that students need access to financial support to allow them to continue with their studies. The cultural environment of the SOSAT is seen as being one that is not familiar or receptive to Maori.

## Section 7: Te Putahi o te Manawa Mentoring Programme

The findings reported in this section relate to data collected from the kaitiaki of the Te Putahi o te Manawa mentoring programme. The kaitiaki work as mentors in the programme and are well positioned to comment on the strengths of the programme and improvements that can be made. Two focus group interviews were conducted involving nine of the fourteen kaitiaki. The kaitiaki interviewed were at various stages in their programmes of study including being in undergraduate, graduate and PhD programmes. Five of the Kaitiaki were also Tuapapa Putaiao Maori Fellows. The findings are reported according to themes identified by the researchers.

### Programme strengths

An important strength of the mentoring programme is the kaitiaki-student relationship. Nurtured from an initial hui where kaitiaki and their allocated students are encouraged to 'get to know' each other, the mentoring relationship has the potential to lessen the isolation experienced by students, enhance problem solving and provide important academic guidance. Kaitiaki, given their seniority to those that they are mentoring, understand the demands of the SOSAT and are empathetic to the cultural and familial isolation Maori science students can often feel. Having fixed times and rooms, where kaitiaki are accessible, allows students to approach their mentors when and where they are definitely available.

Kaitiaki regard the mentoring programme as an invaluable support system. Finding commonality with one another (kaitiaki and students) in terms of ethnic and cultural backgrounds, and academic and career aspirations, has transformed into relationships of support and understanding. The growth of Maori networks has initiated an atmosphere of "togetherness", of being a "whanau".

*Having this programme was the only time you had things Maori...it was the only lifeline I had between science and Maoritanga.*

The programme development of "good/positive role models" should also not be underestimated.

*Being Maori and studying science is isolating, so its good to see what others have achieved.*

The status of kaitiaki in age and experience appears to fit well with students. According to one kaitiaki, "we are not too much older and [more] approachable [than lecturers]". The idea of seeking support through peers is what the programme is based on.

Personally knowing a student eases student anxiety over approaching kaitiaki for help. According to some kaitiaki, this has been the key to helping a number of students. In essence what has worked well with the mentoring programme appears to be senior



Maori students making themselves available as kaitiaki and contributing through the support mechanisms put in place by the Social equity office.

### Areas for improvement

A number of suggestions were made that may improve the overall performance of the programme. These included more consistent communication, the development of facilities, accessibility to resources, and the training and support of kaitiaki. These issues are reported below.

#### Communication

A primary concern for the programme relates to the under-utilisation of its services. The reason, according to kaitiaki is the lack of consistent contact and communication with students.

Despite initial meetings at the beginning of the academic year Kaitiaki report having contact with students primarily during 'panic times' - when assignments or exams are due. Contacting students can also be a frustrating experience.

*The least effective thing we have to deal with is making contact with the student. Addresses they've given are wrong or they've moved, and you can't get in touch with them. Then suddenly you've found out they've dropped out. That's one of the frustrating things, because you wonder, 'well why did they go?' If we'd been able to get in touch with them, would we have been able to help?*

A database of up to date contact information will contribute towards enhancing communication. However, the effectiveness of such a database is reliant on the provision of timely and accurate information. Students often change their abodes during the academic year and fail to advise official university sources, as well as the equity team.

At a very simple level, kaitiaki suggest that the foundation of the kaitiaki-student relationship might be more firmly built by getting to know students before meetings, hui, tutorials, and lab demonstrations. "Know them before you actually went to the meetings and they'll turn up". This contact also includes finding out student lab streams.

*If we could get their lab streams, in that time they would be quite approachable and then you can have a little chat with them...face to face contact in the labs. Labs would be a bit more feasible and personal than in lecturers.*

Involving potential science students from Te Timatanga Hou was another proposal, serving to establish relationships way before the student actually arrives in the SOSAT.

Kaitiaki were adamant that the annual kai and hui for Maori students should be retained, while promoting the mentoring programme outside of the SOSAT and university.

### Common room facilities

The lack of a common room facilities within the SOSAT appropriate for social interaction has also meant students cannot approach and interact with kaitiaki on a more informal and casual basis. “We need our own space”, one kaitiaki said, “which students can be comfortable using”.

The development of a common room facility for all the SOSAT undergraduate and graduate students was advocated. A central location for all students for studying or eating a snack would enable informal interaction between students in a social and casual setting. “It wouldn’t necessarily have to be just for Maori students, because we don’t have the facilities for (science) students at all”. The Te Ahurutanga building at the School of Maori and Pacific Development is an example of such a facility. The kaitiaki felt a similar room and surroundings was needed to create a feeling of ease and comfort for both Maori and non-Maori students.

### Computer and internet access

Increasing the number of computers within the SOSAT and making the internet and email more accessible to undergraduate students was also seen as a strategy to improve communication and the dissemination of information between programme organisers, kaitiaki and students. As graduate students have the priority use of computers in the SOSAT, the development of internet resources for undergraduate use, has limited potential although there are terminals with internal campus web access available in the university library.

This aside, a web site to support the Putahi o te Manawa mentoring programme has been developed. According to its creator the site is a, “one stop place for everything you want to know about”. One intention of this site is to link Maori science students with other organisations accessing Maori scholarship information and applications.

### Kaitiaki training

More training for kaitiaki was suggested. The ambiguity of the role was summed up by the following comment.

*Its what you want it to be really, and how far you want to go. If you want to be involved in your student’s problems, that’s what you do. If you just want to be a tutor, that’s all you do.*

Most kaitiaki claimed they had no training and relied upon their own experiences of being mentored. They felt that they would benefit from formal training workshops that could take place at the beginning of each academic year. Follow up workshops

during the year might also help resolve any ongoing difficulties the kaitiaki might experience as well as providing for programme organisers an opportunity to monitor the progress of the programme.

### Further ideas

One kaitiaki proposed the development of communication with and support from Maori communities. Maori guest-speakers from outside of the SOSAT and university could be sought, to link Maori notions of science with Western ideals and concepts.

*An effort is needed to produce Maori scientists, not scientists that are Maori [comment by a kaitiaki].*

Further improvements to the programme include internal social sporting events and inter-departmental challenges. The Maori students of the SOSAT and Maori Law students have already competed against each other, establishing new and exciting Maori networks.

The importance of these suggestions is in their contribution to effectively increasing the contact and communication lines between kaitiaki and students. The resultant processes will inevitably expand the utilisation of programme services.

### Specific support for first year students

With regard to specific support strategies for first year Maori SOSAT students, kaitiaki suggested having study groups or more tutorials for Maori students. Again, they re-emphasised the need for a common room, email access, and more socialising outside of science providing first year students with a wider scope of university life. One suggestion sought to invoke pride in being a Maori science student by designing a clothing line to purchase and wear.

### Tuapapa Putaiao Maori Fellowship recipients

Recipients of the Tuapapa Putaiao Maori Fellowships are involved in many activities. These include mentoring, role modelling, public speaking, encouraging and basically informing Maori of potential options within science, as well as meeting their course requirements and reporting deadlines. According to all the Fellows, the scheme does not place any excessive demands on them, but it does encourage students to complete their degree - preferably on time. Their progress towards this goal is monitored through 6 monthly reports provided to the FRST.

Fellowship holders acknowledge that they feel privileged to have been given the opportunity to pursue a higher degree in Science through the support afforded by the TPMF scheme. This mantle is not taken lightly and they willingly act as advocates for higher learning, particularly for SOSAT, to whanau, hapu, iwi, Maori groups, friends and anybody else willing to listen. Participating as kaitiaki is consistent with their willingness to encourage and assist other Maori.

Fellowship holders initially reported that they were apprehensive about their obligations to the TPMF Scheme and FRST. However, those concerns quickly wore off as Fellows came to terms with the requirements of their degrees. Indeed, the FRST thesis deadline requirements were in concert with where the students themselves wanted to head.

An issue raised by fellowship recipients was the need to have people available to them who could provide academic supervision, and who understood and validated Maori concepts of science and human relationships with the Maori scientific world. The availability of academic supervisors able to integrate a Maori worldview into science, and to afford the recipients guidance and insight was felt to be lacking in the SOSAT. That there are few Maori academic staff in the SOSAT supports this view.

Fellows also wanted to be more informed of other recipients of the fellowships so that they might develop these contacts as networks for future reference.

Recipients of the Tuapapa Putaiao Maori Fellowships felt that the fellowships were extremely worthwhile and that they were privileged to be holders. Forty-one percent of students who completed our questionnaire have found scholarships helpful, and 70% found money a barrier to study, which indicates a more general appreciation for financial support.

Only 5% of current SOSAT students recognise TPMF fellows indicating that they are not performing as well as they could as effective role models.

### Section summary

The feedback from the kaitiaki suggests the mentoring scheme is most effective because of the support systems it provides for Maori students throughout the SOSAT. Commonality between the kaitiaki and the mentee in terms of being Maori, and having experienced the academic, cultural and social demands of pursuing a science degree provide an insightful foundation for mutual understanding and support.

Kaitiaki have been quick to point out the frailty of the programme. Most attention focuses upon the lack of consistent contact and interaction between kaitiaki and student. The objective of the programme has been to:

*provide students with the opportunity to access the knowledge and experience of someone that they can relate to and that knows what the student is going through (University of Waikato, July 1999, p.7).*

However this is not necessarily occurring. The effect of inconsistent contact is under-utilisation of programme services. 'Getting in touch' with students and maintaining that contact has been frustrating and at times, futile. When students drop out, a sense of helplessness descends as kaitiaki ponder 'what might have been.'

TPMF fellows are not widely recognised but are grateful for the financial help they receive and do not perceive the scholarships as being unduly onerous. Twenty-seven percent of students in our survey found that either appropriate role models (18%) or the number of Maori students (9%) was helpful to them during their first year of

study. TPMF fellows indicated a desire to be in better contact with other fellows, which suggests that the fellows should be more pro-active in advertising their position as fellows and telling younger students what this means.

## Section 8: Maori Secondary School Students and Science

In this section, we report that information collected in key informant interviews with the Heads of Science Departments (HODs) from the four secondary schools targeted by the SOSAT equity team. Given the similarity of context, we have also chosen to report, at the same time, that data collected through questionnaire surveys completed by Maori secondary school students.

All HOD's had completed undergraduate science degrees but only one had completed a Masters degree in Science. All were passionate about teaching science both generally, and in relation to specific science subjects (ie., biology, chemistry; physics), all having intended, while training, to become science teachers.

Throughout the Aotearoa/New Zealand education curriculum, science is compulsory for all secondary school students in both Year 9 (Form Three) and Year 10 (Form Four) levels. Of the four schools that participated in the research, only two had compulsory science for year 11 (Form Five School-Certificate). For these particular schools, early science programmes were created and promoted as fun and enjoyable. HOD's reported that fun and enjoyment are fostered through science competitions, school science fairs, and field trips outside of the school. They suggest that these experiences contribute to a student's healthy choice of science.

*Students are encouraged at third to fifth form level to enjoy science and succeed at the subject. This situation leads students to continue with science through to sixth form and bursary [Key informant interview with an HOD].*

According to the student surveys, most (74%) believe that developing a personal interest in science, and becoming informed of career prospects and opportunities are the most important things they can be developed.

*Students [often] have a particular career in mind...with science a major component to realising that career [Key informant interview with an HOD].*

Students report (45%) that they have received encouragement (that is sometimes perceived as pressure) from family, friends (peers), and role models to study science. For many Maori students however, science offers very little appeal and is avoided if possible. In the schools that took part in this study, it is not uncommon to have no Maori students in physics or chemistry and the very few that have retained an interest in science, favour biology. According to one HOD,

*...biology seems more human to the Maori students than the mathematics of physics and chemistry [Key informant interview with an HOD].*

The affinity with biology as a subject seems to be somewhat reflected in student survey results. Maori students from one school, choose only to study biology at Year

12 and 13 as a subject that complemented their interest in Physical Education (PE). However, other students (33%) avoided biology because they considered it difficult.

### **Barriers to doing Science**

The major concerns raised by HOD's relate to the social and academic background of Maori students. They believe that limited exposure to Western science ideas and theories, lack of encouragement and support from home and peer pressure all contribute as barriers.

*Poverty and poor socio-economic situations leads to little support in terms of resources and an appropriate home environment for the education of kids [Key informant interview with an HOD].*

Options in science are limited for Maori students, according to HODs, as families have very little involvement and or interest in the discipline. Many of the school's Maori families are at the lower end of the socio-economic scale, and insufficient funds generally mean lack of appropriate resources, workspace in the home and educational tools.

As already mentioned HOD's felt that peer pressure was another barrier for Maori students.

*Individuals may not be allowed to excel at the expense of the group [Key informant interview with an HOD].*

A view expressed by students (31%) who agree that 'peer pressure' is a concern. It would seem that for some Maori students, their first allegiance is to friends, peers, and sport. Some Maori scientists reiterate this view (Martin, 1996)

*Maori kids excel at sports but don't balance this with their classroom work [Key informant interview with an HOD].*

A similar concern for HODs is student relations with science teachers. According to 21% of Maori students surveyed, an inability to relate with the teacher and simply disliking the teacher is motivation enough to distance himself or herself from the subject. Whether this alienation results from the teacher's negative stereotype or the subject's failure to engage students is unclear. Since 27% of respondents to our survey cited their teacher as important in their subsequent degree choice this figure is concerning.

HOD's felt that recognising their own potential and ability is often difficult for Maori students. Coming to grips with scientific terminology and concepts is very demanding, especially when reading levels are a year or two below expectations.

*Lack of knowledge means they cannot keep up...eventually they lose confidence and interest in science [Key informant interview with an HOD].*

As a consequence, the discipline is avoided. The lack of Maori context in the teaching of science and absenteeism are additional problems.

Life history interviews (Martin, 1996) have indicated that particular events and key influential people have a significant impact on at least some Maori people who choose science as a career. Furthermore, negative perceptions and low expectations by teachers were demoralising. In our survey 55% of current science students cited some person (a teacher, role model, parent or mentor) as being influential in their degree choice. Given the influence of important people in young people's career choices it seems imperative to get good Maori science teachers in schools and to raise the profile of existing role models and create more.

### **Encouraging Students to University**

Encouragement of students is very similar for all four schools. University visits are an important part of that encouragement. It allows students to familiarise themselves with the context of higher learning and identify with the surroundings. School visits generally include career and open days, SOSAT field trips, and a Biology day. Exposure to tertiary opportunities was viewed by students as essential (79%) to making informed decisions about their lives.

The promotion of tertiary education is generally nationwide and not restricted to attendance at the University of Waikato. Advertisements, posters, guest speakers, and school careers advisors are common vehicles for promotion, as are school visits to institutions. The numbers of school visits vary according to what type of programme an institution is offering. In general, visits occur 1 – 3 times per year, especially for schools in the Hamilton/Waikato district. One school preferred to send only their achieving students on visits to university.

Additional issues for the HODs, and for the students, included the need for general encouragement of Maori students to pursue tertiary studies, not just in science. HODs felt there was a need to focus encouragement and the further development of students according to their interests and potential. The setting of high standards, using mentors/role models and informing students of possibilities was seen as important to effective encouragement. In addition to the overall drive to move Maori students towards tertiary studies, HODs felt that schools are reliant on teachers identifying and targeting encouragement towards students that show real potential at science. Perhaps a final, but important point made by HOD's was the need to provide a positive school environment with opportunities to excel at science through to the tertiary level.

### **Section summary**

In summary, HOD's were enthusiastic about being teachers of science and generally cognisant of issues facing Maori students. As found by Jefferies (1997), the issues are complex and are not easily resolved within the classroom, or the school setting. To affect the choices of Maori students early in their secondary school life seems to be a reasonably tactical approach. The idea of school visits, and field trips with 'hands on' experience seems in concert with HOD's presenting science as fun and enjoyable.



The findings bear out the primary and influential role of peers, parents and the home environment, as well as the school and teachers in swaying Maori students towards or away from science as a subject taken while at secondary school. The effectiveness of efforts made by the SOSAT equity team need to be measured against this backdrop.

Given what appears to be large pressures faced by Maori secondary school students, it was heartening to note that most agree that developing a personal interest in science, and becoming informed of career prospects and opportunities are important to their development. Furthermore, that students thought that exposure to tertiary opportunities was essential to making informed decisions about their lives affirms the worth of field trips and visits by the SOSAT equity team.

## **Section 9: Discussion**

In this evaluation we set out to determine the effectiveness of social equity strategies for Maori students in the SOSAT at the University of Waikato. In particular, we aimed:

- i. to determine the extent to which the social equity strategies within the SOSAT are having their intended effect;
- ii. to determine which of the strategies are working most effectively; and
- iii. to highlight the barriers to the mentoring programme (for students)
- iv. to identify improvements that can be made.
- v. Investigate the impact of role modelling on choices made by Maori students.

The major findings of this evaluation have been reported and summarised in the chapter previous to this, and will not be repeated here. However, a discussion of the findings as they relate to the aims of this evaluation is in order. This is achieved below, and is followed by a discussion of the limitations of the evaluation and concludes with suggested areas for further investigation. Recommendations are included in the following section.

### **Are social equity strategies having the intended effect and which are most effective?**

The social equity strategies employed by the SOSAT set out to increase the participation of Maori in science by recruiting and retaining Maori students within the SOSAT. Two of the specific recruitment strategies used are School visits and field trips. These are long-term strategies, in the first instance, targeted at 4<sup>th</sup> form students who will not be eligible to enrol at university until at least two years from the time of their 4<sup>th</sup> form field trip or visit to university. The School visits tend to attract more senior students who are within a year of enrolling at university.

The data available provides a general indication of a possible positive effect by the social equity strategies aimed at recruiting Maori into the SOSAT. Contrasted with

the increases in the participation of other minority ethnic groups in the SOSAT, the Maori rate of increase appears to be slightly greater suggesting a corresponding relationship with the social equity strategies employed by the SOSAT, rather than being solely related to demographic changes. The extent of the effect contributed by social equity strategies may never be fully determined.

Although the social equity strategies may be effective, one should not underestimate the complexity of issues that Maori secondary school students have to negotiate in their journey towards tertiary study. That Maori school leavers are choosing to attend university, and to choose science in particular as a career path is a major achievement. Indeed, the SOSAT has been forward thinking in implementing strategies to not only recruit Maori students, but also to retain them. Although the primary strategy employed in the SOSAT is the Te Putahi o te Manawa mentoring programme, the success of the strategy in assisting students to write grant and scholarship applications is reflected in the high number of Tuapapa Putaiao Maori Fellowship holders in the School (currently 11). This activity directly impacts the extent to which students can participate efficiently in tertiary education and the social equity office should be encouraged in this regard.

Cosgrove (1991), found that students who participated in a mentoring programme were more satisfied with their university surroundings and shared greater developmental gains, than those not in a mentoring programme. We must point out that we have not incorporated a control group into the design of this evaluation - nor have we any baseline data to measure the extent to which Maori students feel more comfortable and accommodated within the SOSAT. However, kaitiaki have reported that the impacts of the Te Putahi o te Manawa mentoring programme include a sense of belonging, being supported (as a whanau), making friends and being comfortable in the SOSAT environment.

Forty-one percent of undergraduate students recognised kaitiaki as a source of support. In contrast only 28% of Maori students saw tutors and lecturers as a willing source of support. Help from kaitiaki was seen as valuable and 32% of students had been helped by a kaitiaki in their first year of study. All undergraduates who had contacted their kaitiaki (n=28) reported that the help they received from their allocated kaitiaki was helpful. Forty-six percent of undergraduates reported a perception that no suitable role models was a barrier for them, while 18% indicated that having a good role model had helped them with their studies. In contrast to those views, and those expressed by kaitiaki, who themselves may perceive and have come to enjoy a more friendly environment within the SOSAT, the results of the questionnaire survey of undergraduate Maori students in science also reveal a different view. Of the 54 students who responded, only 28% of respondents had contacted their allocated kaitiaki. This low figure is puzzling in light of the other results. Because the question concerning help was specifically about the first year of study it is possible that many of the respondents were not in their first year of study, and felt they no longer needed support from kaitiaki, but rather were able to approach lecturers and tutors. Not all students will require academic support from their kaitiaki, nor can they be made to use it, hence knowing it is there, even if it is not used may enhance students' experiences. On the other hand, the incidence of respondents feeling shy and whakama indicates kaitiaki and the SOSAT could do more to

facilitate contact. Our discussions with the Social equity officer for the SOSAT further suggest that students who are in contact with kaitiaki tend to work with them in an ongoing fashion, rather than just for 'one off' support. Other valuable sources of help were SOSAT tutorials and demonstrations and students indicated a desire to increase the number of these, along with facilitating greater student-staff interaction.

### **Challenges to social equity strategies and improvements**

The social equity strategies in the SOSAT are innovative and on the whole, productive. Nevertheless, there are improvements that can be made. In short, they are to reassess the organisation of the Putahi o te Manawa mentoring programme, and to increase the number of Maori academic staff in the SOSAT. By focusing on these two challenges, other barriers perceived by Maori students to their satisfactory and successful completion of science degrees may also be reconciled.

#### **The organisation of the Te Putahi o te Manawa mentoring programme**

It would appear that the greatest barrier for students in accessing the support and assistance afforded by the Te Putahi o te Manawa is connecting with kaitiaki. The results suggest that when students are connected with kaitiaki, that they do utilise the service. Furthermore, the extent to which they feel competent within the SOSAT environment increases.

At present, the method of making contact with students is reliant on accurate information as to where students reside, and what their current phone numbers are. The social equity office and kaitiaki, are dependent upon the student advising them of any change of address, although the social equity officer reports that other strategies are used - those being to try to make contact with students while they are within the SOSAT physical environment. To some extent, this is successful, however, our results do not support this view.

This result also points to what we believe is a fundamental flaw in the programme. That is, that the structure of services offered by kaitiaki and the social equity team, might be viewed as additional or outside of the formal, ongoing activities of specific courses (ie., course work, tutorials and demonstrations). If the mentoring programme were to be integrated with normal course activities, the problem of connecting with students may be reduced, as kaitiaki acting as tutors or demonstrators will be in regular contact with students. An added advantage would be that the kaitiaki-student relationship would be more sharply focussed on academic achievement specific to courses that students were enrolled yet still retain those benefits usually expected of a mentoring relationship. Additionally, some of the role ambiguity that kaitiaki reported experiencing may reduce.

We suspect that recruiting kaitiaki as tutors and demonstrators will also have a beneficial effect for kaitiaki in that they too may become more connected with other demonstrators and tutors, and more importantly, with SOSAT staff other than their research supervisors. The academic resources available to kaitiaki therefore become more diverse. For those pursuing post-graduate degrees the isolation experienced through a research based degree can be difficult to cope with. Moreover, their wider

involvement in structured courses can position them in such a way where they are seen not only as role models for other Maori students, but their very presence challenges stereotypical views that might be held of Maori in relation to science.

Access to email and internet facilities will also help to facilitate connecting and communication between kaitiaki, the social equity office and students. As email addresses remain relatively stable, this might also resolve the difficulties experienced through students changing addresses. For students who do not have internet access outside of the university, they are reliant on university resources. Consideration might be given to providing computing facilities within the SOSAT dedicated solely to email and internet use.

### Maori Academic Staff

A further barrier identified in this evaluation, was the lack of Maori academic staff. Although kaitiaki serve as role models for undergraduate students, students in this evaluation recognised that for their own academic and career direction, their development would be better assisted with exposure to, and assistance from, Maori academic staff who are capable of challenging and formulating 'science' within a Maori world view. Currently, they are reliant upon generating these views from within their own ranks.

The lack of Maori academic staff in the SOSAT was also discussed with the Dean of the SOSAT who viewed this position as one that needs to change but was frustrated by a lack of qualified personnel - that is, Maori who have at least a doctoral degree in science. The advantages to students, faculty and discipline, of having minority faculty on staff, as well as recruiting, retaining and mentoring minority faculty, is well documented primarily as it relates to the experience of diversifying organisations and academic institutions in the USA. In line with this literature, one of the major challenges that Maori academics are likely to face is finding resource material to support their teaching and research, especially if they are appointed specifically to focus on Maori issues or perspectives. Unlike other academics whose subject areas are usually well developed, Maori academics often have to start from the point of generating research and writing their own resource texts. Other challenges relate to: adapting to the organisational culture and environment; dealing with racism - both individual and institutional; teaching and research skills; being expected to contribute across a wide range of courses; being isolated; being the staff member that deals with equity issues; being the staff member who fulfills equity requirements, and being spread so widely as to have little time or energy to meet that criteria expected for staff promotion or tenure (see Bunzel, 1990; Durie, 1998; Johnson, 1997). In developing positions that will be filled by Maori faculty, these issues need to be taken into consideration.

As suggested by respondents - until the SOSAT appoints more Maori staff, Maori who are situated outside of the SOSAT (in the wider university; at other institutions; in the private sector) might be drawn upon as resource people to provide guest lectures, guidance and advice on research, and other contributions. This will also serve an important networking function.

## Enhancing the first year experience of Maori students

In addition to what has already been suggested above, the results indicate that developing the help-seeking skills of students is likely to enhance their experience of first year study. Students reported being shy, whakama, and generally uncomfortable about seeking support. It would seem that kaitiaki are proactive in this regard, offering support, rather than waiting for students to ask for support. Nevertheless, they are only a small source of potentially available support. Lecturers, tutors and demonstrators might also take a more pro-active stance to establish an environment and culture that supports and rewards help-seeking behaviour.

## Conclusion

In conclusion, the efforts made by the social equity team and the SOSAT are to be commended. Their efforts and outcomes must be viewed against a backdrop of a very complex situation that has a multitude of contributors from diverse sources that act as barriers to Maori students access to careers in science (Jefferies, 1997). For those that are successful and fortunate enough to be in a position to enrol in and pursue degrees in science, efforts to increase their retention and to ensure their success are vital for changing the current under-representation of Maori in science professions.

The approach taken by the social equity team is multi-faceted. Their strategies are targeted not only at students already at university, but at Maori secondary school students. Role modelling and mentoring on the part of more senior students are major strategies used and appear to have a positive effect on how Maori students feel about the environment and experience of science at university. The TPMF scholarships and their recipients have helped these actions implemented by the SOSAT. Our findings are consistent with those from earlier studies reviewed in section 2. What will complement these strategies further is the inclusion of Maori within the academic staff of the SOSAT, as well as networking with Maori resource people in the wider communities of Maori, the university, and science in general.

We recognise that our evaluation has a number of limitations. They are:

- i. Lack of baseline information, in the form of either a previous study, or in the form ongoing evaluative material about the experiences of Maori university students in the SOSAT, means that we are unable to confidently report a contrasted result.
- ii. Limited access to raw student data, which has limited our analysis of data.
- iii. That the strategies employed must be considered to be still in a formative stage. Fine-tuning is still occurring; the effects of which cannot be determined at this point in time. The consequence of this is that we have been unable to clearly identify programme impacts even though possible impacts have been inferred.

## Section 10: Recommendations

### *Recommendations*

In light of what we have found through this evaluation we make the following recommendations.

- i. That the Social Equity Office of the School of Science and Technology continue in their efforts to recruit Maori to university through school visits and field trips.
- ii. That the Social Equity Office of the School of Science and Technology continue to support Maori students in the SOSAT through the writing of grant and scholarship applications.
- iii. That the Social Equity Office and the Dean of the School of Science and Technology continue to offer Science-help tutorials and enhance the effectiveness of the Te Putahi o te Manawa mentoring programme by aligning mentoring activities with those of tutoring and demonstrating within the usual structure of courses offered by the SOSAT.
- iv. That the Dean of the School of Science and Technology take action to appoint one, if not two, Maori academic staff members to the School. In taking this action, we urge the Dean to consider that Maori academic staff are likely to have few resources readily available to them to support their teaching activities. In the initial period of their appointment support will be needed in order that they may develop a comprehensive research programme. Until such appointments are made, effort and support should be given to cultivating networks with and the participation of Maori in the wider community, as well as in science.
- v. That the Social Equity Office, with the assistance of the university's Teaching, Learning and Development Unit, seek to obtain regular, written evaluative feedback from kaitiaki and Maori students.
- vi. That TPM fellows be more proactive in asserting that they are recipients of these scholarships and discuss with others what being a scholarship recipient means to them.

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## Appendix 1 Tuapapa Putaiao Maori Fellowship Recipients

<b>Recipient</b>	<b>Year Fellowship Awarded</b>
Anderson, Vanessa	1998
Connew, Cherry	1998
Dunn, Amber	1999
Grimshaw, Donna	1998
Loader, Jared	1999
Melbourne, Maia	1999
Mohi, Gina	1999
Ruru, Ian	1996
Tawhai, Veleta	1998
Turuwhenua, Jason	1996
Wilson, Aaron	1996

- Two TPMF fellows have completed their degrees:

Erica Williams (Biology)

Catherine Iremonger (Earth Sciences)

## **Appendix 2: Kaupapa Maori tutorials in Psychology - Policy Document**

### **Kaupapa Maori tutorials in Psychology - Policy Document**

#### **Background:**

Kaupapa Maori tutorials have formed a part of the normal life of many courses in the psychology department since 1990. Consistent with the University's broad strategy for development, Kaupapa Maori tutorials seek to enhance the Maori presence and participation in the University by creating a space for Maori students where they can meet the challenges of course work in an environment that is safe, tailored to their needs and to their cultural reference points. This paper seeks to:

- i. clarify the nature of Kaupapa Maori tutorials,
- ii. describe a clear process whereby Kaupapa Maori tutorials are established, sessional assistants selected, trained and supported
- iii. identify areas where confusion in the process of running Kaupapa Maori tutorials is likely to occur, and recommend strategies to avoid the same.

#### **Note on terminology:**

In our department we employ a number of people in different capacities to support students. The titles that are tagged to these positions include: sessional assistants and demonstrators. The term 'tutor' to refer to a 'sessional assistant', although a structural relic, still has social currency. Most are paid out of the department's sessional assistance budget. To simplify the writing of this document I have used the term 'sessional assistant' to refer to those people employed in specific courses to provide academic support to students by way of tutorial or demonstration.

If the term 'tutor' is employed, it is intended to refer to those positions where teaching is the primary focus of their work, and where tutor staff are paid from general staff salaries, not from the sessional assistance pool.

In addition to the above, I use the term tutorial to also include demonstrations, practicals and laboratory work.

#### **Nature of Kaupapa Maori tutorials**

Kaupapa Maori tutorials and Kaupapa Maori sessional assistants (KMSA's) are organised by the Kaupapa Maori Advisory Committee (KMAC) in collaboration with coordinators of respective courses in the department. These tutorials are established to allow Maori students to attain understanding of course content and competency in those skills normally required in a course. The nature of Kaupapa Maori tutorials is that:

- i. the tutorial is usually facilitated by a Maori sessional assistant

- ii. Maori protocols usually govern the environment of the tutorial. This means that if students choose to speak Maori or use Maori terminology then they have a right to do so without translations being given. Additionally, students are encouraged and supported to use a Maori frame of reference to make sense of course materials.
- iii. As in general tutorials, students are encouraged to establish a sense of unity and are supported to form study groups, share notes, and to work collaboratively on assigned tasks.

The need for a Kaupapa Maori tutorial is determined by:

- A viable number of Maori students in a course available to constitute a tutorial. Where numbers are too low, it is often uneconomic to make this option available. Academic support for Maori students in this position is usually provided by the Kaupapa Maori Tutor.
- The nature of the course content. Where the KMAC has anticipated that course content is familiar or easily understood by Maori students then the need for a Kaupapa Maori tutorial is not so great (ie., ex202; 357, 313). However, for the vast majority of courses the content is often quite difficult for Maori students to deal with.
- The availability of suitable people to serve as KMSA's.
- Tutorials being a normal part of course activities (some courses do not offer tutorials).

In addition to what is expected of sessional assistants in a course, KMSA's provide academic support to Maori students by way of individual or small group consultations and through study camps. Study camps involve assisting students as a large group in their preparation for major tests or exams. The KMSA's are employed by the Convenor of the KMAC to provide this service.

It is important to note that Kaupapa Maori tutorials are not *closed tutorials* or tutorials *for Maori only*. At no time should they be advertised as such. To do so is an infringement of the Human Rights Act. Any student who is enrolled in a course that offers a Kaupapa Maori tutorial is entitled to attend that tutorial. However their choice to attend should be on the basis that they are aware and willing to participate in the general spirit of the tutorial prior to 'signing up' and attending [See section on advertising Kaupapa Maori tutorials].

Lastly, it is important that both the KMAC and coordinators of respective courses agree that KM tutorials form part of the normal activities of a course.

### Selection criteria for Kaupapa Maori Sessional Assistants:

People appointed to facilitate Kaupapa Maori tutorials should be selected according to those criteria expected for all other sessional assistants in a course. Additionally, they should:

- i. Be familiar, comfortable and have an ability to facilitate Maori cultural practices (eg., whakawhanaungatanga).
- ii. Have knowledge and experience of Maori cultural patterns
- iii. Have knowledge and experience of the stressors that impact on Maori students within the University environment and have a set of strategies that they can employ to support students to achieve their academic goals.
- iv. Have a basic knowledge of te Reo Maori (66.111 or Purapura).

### Selection and appointment of Kaupapa Maori sessional assistants:

Given the additional skills, attributes and tasks expected of KMSA's, course coordinators are expected to collaborate with the KMAC in the selection of appropriate people. The following process should be followed:

- i. Course coordinators advertise for applications to be submitted for sessional assistant positions in their courses from about December of the previous year.
- ii. Applicants should be asked to indicate whether they would be available to facilitate a Kaupapa Maori tutorial. A space for this should be allowed on the application form and applicants should also be asked to describe those qualities, skills and knowledge areas that they have and would position them well for facilitating a Kaupapa Maori tutorial.
- iii. Of those applicants who have indicated a desire to facilitate a Kaupapa Maori tutorial, the course coordinators should shortlist those who fulfill the normal selection criteria for sessional assistants in their course. The applications of shortlisted applicants should be forwarded to the Convenor of the KMAC.
- iv. The KMAC will discuss the shortlisted applicants to determine whether they meet the criteria for KMSAs. Where deemed necessary, the KMAC may interview applicants. A recommendation on which applicants are appointable as KMSA's will then be made to the course coordinator. This will include a rank order of the most suitable applicants. As the Kaupapa Maori tutor works closely with KMSAs, she/he will have a major input into any recommendations made by the committee.
- v. If an applicant recommended by the KMAC is appointed by a course coordinator, then they will normally be employed by the Convenor of the KMAC to provide consultation hours, study groups and study camps for Maori students *where deemed necessary and if funds are available*.

- vi. After completing selection activities, course coordinators should advise the Convenor of the KMAC as to who has been appointed as KMSA's. This should be advised at no less than two weeks prior to the beginning of a semester.
- vii. Where no suitable applicants are available to serve as KMSAs, the KMAC will discuss alternative strategies with course coordinators to meet the academic needs of Maori students in their courses.

#### Training of Kaupapa Maori sessional assistants:

Often students unfamiliar with the purpose of Kaupapa Maori tutorials perceive them to be activities that give Maori students an unfair advantage. Additionally, they are perceived as 'separatist', against the notion of 'biculturalism' and racist. Training is provided to KMSA's to manage these views.

Prior to the introductory lectures in courses that offer Kaupapa Maori tutorials all KMSA's must attend training meetings organised by the Kaupapa Maori tutor that amongst other things, address the following:

- i. How to communicate the nature of Kaupapa Maori tutorials in a consistent and clear fashion.
- ii. How to deal with claims of racism and separatism that might arise from students.
- iii. How to advise students in choosing whether to attend a Kaupapa Maori tutorial, or a general tutorial.
- iv. How to establish a supportive tutorial climate
- v. How to establish and run study groups and study camps.

#### Advertising and introducing the availability of Kaupapa Maori tutorials to students:

The Departments' Kaupapa Maori tutor will attend introductory lectures in the majority of undergraduate psychology courses and explain her/his role and the nature of Kaupapa Maori tutorials to the class. Having one person explain the nature of Kaupapa Maori tutorials enables a clear and consistent message to be communicated as well as an exact description.

Kaupapa Maori tutorials are often advertised by specifying which tutorials are designated 'Kaupapa Maori', either during class time or on 'sign up sheets' on notice boards in the psychology department. Students are then asked to indicate those tutorials they wish to attend by listing their names on sign up lists, or by selecting a variety of hours that they will be available to attend tutorials.

A number of problems have occurred through using this method. For example:

- Tutorial lists are posted on notice boards without designating that they are Kaupapa Maori tutorials. At a later point in time and after students have listed their names, a tutorial has been designated as Kaupapa Maori. This has resulted in confusion and embarrassment for students, staff and KMSA's at the first tutorial that students have attended.
- Tutorials have been designated as Kaupapa Maori but this is not indicated on sign up lists.
- Tutorials have been designated as Kaupapa Maori, but this is not communicated clearly to students on sign up sheets.

The following are suggested steps to avoid such confusion:

- Post sign up sheets only after establishing when a Kaupapa Maori tutorial is to be offered.
- Clearly advertise that a tutorial is designated Kaupapa Maori. Use large, bright signage.
- Orally communicate the times that Kaupapa Maori tutorials are offered at the introductory lecture.

The first tutorial:

At the first Kaupapa Maori tutorial in a course, the nature of the tutorial is explained again to students by the KMSA. Kaupapa Maori staff usually attend tutorials in part one courses to introduce themselves and to support the philosophy of the tutorials. This is usually followed by students introducing themselves and the tutorial proceeding on with the business of the day provided that there are no issues of concern to students with respect to the nature of the Kaupapa Maori tutorial.

Use of the term 'Kaupapa Maori'.

There have been instances where Kaupapa Maori tutorials have been established in psychology department courses without the knowledge or involvement of the KMAC. Additionally, people assigned to facilitate these tutorials may not necessarily bring the skills and experience expected of KMSA's and it becomes difficult for the KMAC to provide training and support normally offered KMSA's. This is a practice that should be discouraged given that the potential for confusion and conflict to result is high.

To avoid this, staff wishing to establish a Kaupapa Maori tutorial or appoint KMSA's must indicate their interest to the Convenor of the KMAC. A tutorial or sessional assistant can be designated as Kaupapa Maori only if the procedures layed out in this document have been followed.

The KMAC also uses the term Kaupapa Maori in other capacities. These include designating a lecture, course, position or event as Kaupapa Maori. This implies that the KMAC has been actively involved in initiating, developing and delivering these activities. For example, 0518.335 Maori Development and Psychology would be considered a Kaupapa Maori course. The Treaty lecture in 0518.311 Community Psychology would be considered a Kaupapa Maori lecture even though it involves two non-Maori staff from the Community Psychology programme

Should staff wish to use the term Kaupapa Maori in any official capacity or in a manner that implies that the KMAC has been involved and are supportive of a specific initiative then it is appropriate that these ideas be discussed with the KMAC first with a view to establishing a mutually agreeable position.

The Kaupapa Maori Advisory Committee Members are:

Linda Waimarie Nikora (Convenor)  
Taima Moeke-Pickering  
Mahalia Paewai

21 June 1996 - Final policy document



### **Appendix 3 Report of Maori in the School of Science and Technology 1998/1999**

## Appendix 4: List of questions used with Maori undergraduate students in the SOSAT

1) What or who helped you choose science as a subject? (circle where appropriate)

- Teacher
- Interest (personal/career)
- Mentor
- Parent(s)
- Friends
- Other: \_\_\_\_\_  
\_\_\_\_\_

2) Was science a part of your career options before you chose to study it at university? (circle one)

Yes / No / Unsure

3) Do you think science offers you an immediate career opportunity? (circle one)

Yes / No / Unsure

4) If 'No', why not? (Please comment)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5) Do you think science was effectively promoted as a viable career option for Maori students at:

- Secondary School? (circle one)      Yes / No
- Tertiary level? (circle one)      Yes / No

6) What made you choose your present programme of study? (circle where appropriate)

- School visits
  - Teacher perceived as being good
  - Appropriate role model
  - Field trip
  - Career options
  - Personal interest
- other: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

7) Does the School of Science make it easy to select subjects? (circle one)

Yes / No / Unsure

If yes, how? If no, why not? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

8) Do you know you have been allocated a mentor? (please circle)

Yes / No

9) Do you know who your mentor is?

Yes / No

9i) If so, have you contacted them?

Yes / No

9ii) If you have contacted your mentor, has it been helpful?

Yes / No

9iii) If you have not contacted your mentor, why not?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

10) Did you recognise the students that visited your school as Tuapapa Putaiao Maori Fellowship students? (circle one)

Yes / No / Not Applicable

If so, what impact did they have on you? (Please comment)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

11) Who has helped you, or offered to help you in your first year of study?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

12) What help have you found valuable?

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13) What other help, if any, would have been valuable?

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14) What help was of no use to you?

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15) What has (or had) helped you during your first year in science? (circle where appropriate)

- Mentoring
- Staff members – Maori or Pakeha or other
- Appropriate role models
- Scholarships
- High number of Maori students
- Attending the Maori tutorial groups
- Other: \_\_\_\_\_

16) Are there any solutions to making year one in Science easier?

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17) Have you had friends drop out of science courses? (circle one)

Yes / No

If so, what sorts of problems do you think they had to cause them to drop out?

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18) What do you perceive as a potential barrier to Maori students attending tertiary institutions? (circle where appropriate)

- Financial
- No appropriate role models
- Culture
- Location
- Perception of University (i.e. for brainy people)

Other: \_\_\_\_\_  
\_\_\_\_\_

19) Would you have chosen to attend University without having the school visits, field trips, and other information from the School of Science students? (circle one)

Yes / No / Unsure

20) If yes, would your choice of study have been in Science? (circle one)

Yes / No / Unsure

## **Appendix 5: List of questions for focus group interviews with Kaitiaki and TPMF Fellowship students**

### **General Questions for all Mentors**

1. How effective has the mentoring programme been for you?
2. What has worked well with the mentoring programme?
3. What has not worked well with the mentoring programme?
4. What improvements could be made with the mentoring programme?
5. Is the programme the same for everyone (mentors)? Or is it different? (prompt question to question 4 maybe)
6. How has the mentoring programme impacted upon you personally/work?
7. What do you do if students don't contact you?
8. Any emphasis on mentors to attract students and contact them?
9. Do you get paid regardless of working with your students?

### **Question specifically for TPMF students**

- i. How long have you been a TPMF student?
- ii. Should an induction programme be implemented detailing TPMF obligations etc?
- iii. What type of activities have you been involved in as a mentor?
- iv. Where have you been asked to speak/give talks?
- v. Have you undertaken visits to schools?
- vi. What sorts of iwi/hapu activities have you been involved in as a mentor?
- vii. What types of School of Science activities have you been involved in as a mentor?
- viii. Have the activities that you have been involved in as a mentor affected your studies?
- ix. If so, in what way? And how have you dealt with that?
- x. If not, why do you think that these activities didn't affect your studies?
- xi. Do Science undergraduates and the general community know there are recipients of fellowships?
- xii. Do Science undergraduate students recognise TPMF students and what does that mean to them (TPMF students)?

## **Appendix 6: List of questions used with Maori secondary school students**

1) What types of factors influenced (you) students to choose science as a subject?

- Peer pressure
- Family pressure
- Personal interest in the subject
- Career options
- Role model – teacher, business person, social equity person
- Iwi development needs

2) What are some of the barriers to choosing science as a subject?

- Too hard
- Peer pressure
- Don't like the teacher – perceived as being not good
- No knowledge of how to use science as a career or how to apply it
- No suitable role model
- Don't see themselves fitting in to university
- Don't see what university can do for their career
- Don't see relevance of a university career

3) What factors influenced (you) students to choose a University degree?

- Role model
- Encouragement from family, friends, teachers
- Iwi development needs
- Personal choice

4) What are some of the barriers to choosing a University degree?

- Financial
- No knowledge of University or career paths
- Did not take the right subjects
- Too hard – students not academic enough
- School does not encourage Maori students to strive for tertiary education
- No family aspirations for encouragement
- No suitable role model

## **Appendix 7: The School of Science and Technology degrees, certificates and diplomas**

Bachelor of Science (BSc)

Bachelor of Science (Technology) (BSc(Tech))

Bachelor of Science with Honours (BSc(Hons))

Bachelor of Technology (new in 1999)

Diploma in Applied Science (DipAppSc) in Earth Sciences

Postgraduate Certificate in Science (PGCertSc)

Postgraduate Diploma in Science (PGDipSc)

MSc

MSc (Tech)

PhD/Dphil (Doctor of Philosophy)

Mphil (Master of Philosophy)

Certificate of Proficiency (COP)



## **Appendix 8: Participating Secondary Schools**

- \* Ngaruawahia High School, Ngaruawahia.
- \* Huntly College, Huntly.
- \* Fairfield College, Fairfield, Hamilton.
- \* Paeroa College, Paeroa.