High Educ
DOI 10.1007/s10734-011-9413-3

Āwhina: a programme for Māori and Pacific tertiary science graduate and postgraduate success

Marc Wilson · Maree Hunt · Liz Richardson · Hazel Phillips · Ken Richardson · Danna Challies

Abstract In New Zealand, Māori (indigenous New Zealanders) and Pacific students tend not to attain the same levels of educational success as Pākehā (New Zealanders of European descent). Addressing this problem is a particular challenge in the sciences. The kaupapa (values-base) of Te Rōpū Āwhina (Āwhina) is to produce Māori and Pacific professionals to contribute to Māori and Pacific development and leadership through the creation of an inclusive off- and on-campus whānau (extended family) environment where high expectations, aspirations and achievement, collective success, and reciprocity are normalised. This paper reviews theories and practices of recruitment and retention relevant to Māori and Pacific students at tertiary level, presents the rationale for Āwhina in the Faculties of Science and Architecture and Design at Victoria University of Wellington, and assesses the impact of the whānau. Based on analyses of quantitative measures of student achievement, and biennial surveys of student responses from the first 6 years of Āwhina, it is suggested that the results are consistent with improving Māori and Pacific graduate and postgraduate achievement and retention. Potential implications for efforts to reduce disparities in tertiary education in New Zealand and elsewhere are summarised.

Keywords Māori and Pacific tertiary success · Science education · Under-represented minorities · Whānau environment · Mentoring

Introduction

In New Zealand, as in other countries, there are persistent and continuing ethnic disparities in academic success at tertiary level (Coxon et al. 2002; Gorinski and Abernethy 2007; Juhong and Maloney 2006; Kuh et al. 2006; Lewis et al. 2009; Scott 2003; Shulruf et al. 2008). The disparities are particularly obvious for science subjects, especially at

M. Wilson · M. Hunt · L. Richardson · H. Phillips · K. Richardson (✉)
Victoria University of Wellington, PO Box 600, Wellington 6140, New Zealand
e-mail: ken.richardson@vuw.ac.nz

D. Challies
Massey University, Palmerston North, Private Bag 11 222, Palmerston North 4442, New Zealand

Published online: 08 February 2011

postgraduate level (Kuh et al. 2006; Lewis et al. 2009). It is therefore of considerable interest that the number of Māori and Pacific science undergraduates and postgraduate students has increased substantially under an initiative at Victoria University of Wellington (VUW). Te Rōpū Āwhina (Āwhina), built around the Māori concept of whānau (extended family) and resourced by the Faculty of Science (FoS), is now in its eleventh year. It has been particularly successful at growing Māori-Pacific postgraduate science numbers: for the 3 years 1999–2001, there were 84 Māori-Pacific science degree completions, of which 26 were at postgraduate level. In the 3 years 2007–2009 there were 234 science degree completions of which 60 have been at post graduate level.

Why is Āwhina's success important? First, for both socio-economic and demographic reasons, the historical divergence between Māori-Pacific and Pākehā (New Zealanders of European descent) living standards and educational achievement widened in New Zealand during the economic restructuring of the 1990s (Pool 1991). By 2001, for example, Māori-Pacific students were heavily under-represented at universities nationwide, with student numbers about half that expected demographically. Furthermore, the educational experience of the 1990s may well be repeated as universities adopt a managed enrolment approach in response to capped government funding following the 2008 recession. Second, Māori and Pacific populations are expected to grow more rapidly than the European population with projected increases between 2001 and 2021 of 28, 58, and 1%, respectively (Ministry of Health 2003). Greater relative increases at younger ages are expected for both Māori and Pacific groups. Currently Māori make up 14.6% and Pasifika 6.9% of New Zealand's population (Statistics New Zealand 2007; Statistics New Zealand and Ministry of Pacific Island Affairs 2010).

These economic, social, educational and ethical imperatives helped motivate the main objective of this study: to draw conclusions from the first 6 years of Āwhina, summarise early results in the context of national and international experience, and make this information available to a wider audience. Our specific objectives are:

1. To provide an overview of how Āwhina works within the VUW Faculties that resource it (the 'Āwhina Faculties').
2. To review recruitment and retention theory and practice relevant to Māori-Pacific students at tertiary level and compare these with Āwhina principles and practices.
3. To summarise results from the first 6 years of Āwhina and show that these results are consistent with an Āwhina "effect" i.e., a positive influence on Māori-Pacific tertiary science success.

The first two specific objectives are important because Āwhina is not directly based on a retention-theoretic perspective. Rather, it grew out of the decades of hard-won empirical conclusions about determinants of Māori-Pacific science success drawn by one of the authors (Liz Richardson) first as a Pacific university science student (the first in her family to undertake tertiary study) in New Zealand during the late 1960s and early 1970s, and subsequently as a science teacher in New Zealand at both secondary and tertiary level. Neither is Āwhina a traditional institutional top-down "support programme". Rather it is an on- and off-campus whānau that has developed strong partnerships with grass roots Māori-Pacific communities and, jointly with those communities, is focused on developing a culture in the Āwhina Faculties that fosters Māori-Pacific success.

Further development of Āwhina requires reflecting on the lessons of international theory and best practice. However, it is our view that the Āwhina experience will not only affirm but also inform international efforts to reduce ethnic disparities in academic success at

tertiary level. This is the reason for the third objective which, while not yet a definite proof of success, is intended as a necessary first step toward that goal.

Background to the establishment of Āwhina

The relevance and importance of Āwhina cannot be understood outside of the socio-cultural and political contexts within which it was established and operates. New Zealand is a relatively young country that came into being with the colonisation of Aotearoa and the subjugation of the indigenous people who are collectively known as Māori. In traditional times Aotearoa was made up of numerous hapu and iwi (sub tribe and tribe) all of whom had their own dialects, knowledge systems, values and practices. Māori identity, despite the multiple contexts in which it now operates, continues to be anchored in the primary social unit of whānau which in turn is embedded in the fabric of hapu and iwi whakapapa (genealogical relatedness).

While the word Māori was in the lexicon prior to colonisation, the way it has come to be used is a post-colonial construct. The Treaty of Waitangi, signed in 1840, established a set of rights that included self determination and equality for Māori, and protocols for both Māori and Pākehā to live by. Despite this the outcome of colonial processes and practices has meant the marginalisation of Māori and loss of self determination. State-provided Māori education was established early on and used as the primary vehicle through which Māori were assimilated. In contemporary times Māori have asserted their rights to self determination—to simply be Māori (Penetito 2004) as defined by Māori—and education is now seen as the key to progressing Māori aspirations. In recent years kaupapa Māori (by Māori for Māori) initiatives, including Māori-medium schooling and wānanga (Māori tertiary institutions) have been established so that these aspirations can be realised.

Since the 1940s New Zealand has had a growing multi-ethnic and heterogeneous Pacific population. By March 2006 immigration policies implemented to meet unskilled labour demand had led to a Pacific population of 266,000 which was 6.9% of the total New Zealand population (Statistics New Zealand and Ministry of Pacific Island Affairs 2010). This Pacific population includes people from Samoa, Cook Islands, Niue, Tokelau, Tonga, Kiribati, Solomon Islands, Vanuatu, Papua New Guinea and Fiji. There is considerable demographic (including educational) diversity among these groups. The six largest Pacific groups living in New Zealand are Samoan, Cook Islands, Tongan, Niuean, Fijian and Tokelauan (Callister and Didham 2008; Statistics New Zealand and Ministry of Pacific Island Affairs 2010). Like Māori, the Pacific population is young, particularly those born in New Zealand: the overall median age is 21 years compared to 36 years for the total New Zealand population. In 2006 three out of five Pacific people were born in New Zealand (Statistics New Zealand and Ministry of Pacific Island Affairs 2010).

The ethnic and cultural diversity of the Pacific population, along with the shifting nature of the concept of ethnicity and the increasing proportion of multiple ethnicities among younger Pacific people, has led to a constantly-evolving Pacific identity. For example, New Zealand-born Samoans have asserted their ethnic identity in different ways to their parents and grandparents (Coxon et al. 2002). For the purposes of this paper we use the term Pacific, even though labelling the ethnic diversity that exists within New Zealand's Pacific communities in this way is problematic (Ferguson et al. 2008; Penn 2010). However, it at least recognises the collective significance of these communities which together form the second largest 'multi-ethnic minority' in New Zealand (Coxon et al. 2002).

Māori-Pacific experience in tertiary education

Since the collection of ethnicity data, which began in the late 1980s, much has been written about the inequalities between Māori and Pacific tertiary participation, retention and completion rates and those of their Pākehā counterparts. Despite a growth in enrolments in recent years Māori and Pacific students remain under-represented in university study (Coxon et al. 2002; Ministry of Education 2008; Ministry of Social Development 2009). A key issue is that Māori and Pacific students are more likely to leave school early and with fewer qualifications compared with Pākehā students (Ministry of Education 2008). In 2007 under half (43.9%) of Māori students and just over half of Pacific students (56%) left school with National Certificate of Educational Achievement (NCEA) Level 2 or higher compared to 70.6% of Pākehā students (Ministry of Social Development 2009). Those Māori and Pacific students who go on to complete their secondary schooling are just as likely to gain entry qualifications and go to university as Pākehā students (Ministry of Education 2008). Pacific students with entry qualifications are more likely to enrol at university than either Māori or Pākehā with entry qualifications, while Māori with no qualifications are more likely to enrol than other ethnicities with no qualifications (Shulruf et al. 2008). However, in at least one large university, both Māori and Pacific students are more likely to have low first year GPAs (Shulruf et al. 2008). The low level of qualifications Māori and Pacific students hold "not only bars their entry into many programmes, but also restricts the level of programme into which they can gain entry", and as a consequence start their tertiary education at a disadvantage (Coxon et al. 2002).

In 2008 Māori had the highest participation rate (16.9%) in tertiary study than any other ethnic group (Pākehā 11.4% and Pacific 11.8%, Ministry of Social Development 2009). However, Māori were more likely to be enrolled in certificate and diploma rather than degree programmes and attend wānanga, institutes of technology/polytechnics or private training providers than universities (Ministry of Education 2008) and, while enrolments in tertiary education have increased in recent years, retention and achievement continue to be problematic (Gorinski and Abernethy 2007; Penn 2010).

In 2006, Juhong and Maloney (Juhong and Maloney 2006) reported that, of a cohort of students enrolled in Arts and Science degrees at a large urban university in 2000, Māori-Pacific students were significantly more likely to be enrolled in an Arts degree (80% Māori; 74% Pacific) than Pākehā students (61%). Furthermore, during the course of the study, 57% of Māori and 62% of Pacific students dropped out compared to 40% of Pākehā. Poorer performing students were more likely to drop out and, the lower their grade point average, the earlier this happened. Māori-Pacific students were more likely to drop out at any particular stage compared with Pākehā students with the same grades and background, and had mean grades 19–39% lower than Pākehā students after controlling for background. Juhong and Maloney noted that the relationship between secondary school success and university success, although important, was not as strong for Māori-Pacific students as for Pākehā students. They concluded that improving the academic performance of Māori-Pacific students in the first 2 years of university study would lead to greater retention of these students.

A phenomenological study of Māori university students (Phillips 2003) found that their experiences in the first year of their study was critical to their ongoing success. Preparedness for university study, being the first family member to enrol at university, part time enrolment, family commitments and failing papers all contributed to students dropping out but were not in the view of the students the most important reason. Rather they cited the university, its culture, curriculum and practices as monocultural, alienating

and non-welcoming. The students who went on to successfully complete their degrees did so through actively maintaining their Māori identity and seeking out other Māori students to study and socialise with. They invoked whakapapa to establish connections with other students and create metaphorical whānau. The students who maintained a strong identity were able to strategically counter and critique the alienating effects of the university culture and its curriculum through their course work.

Similarly Penn found that "cultural adherence" of Samoan students to their language and culture was a positive feature of their identity and positively impacted their experiences at universities that operated a deficit service delivery model (Penn 2010). The students preferred to use informal peer support rather than access the institutional support on offer through academic support services. Aiga (family) was cited by this author as the most important factor in student success, who also argues for the harnessing of Samoan 'cultural capital' (that is, the support of aiga) to transform practices.

Much of the literature on tertiary participation, retention and success is deficit focused. The statistics may reflect outcomes but they do not represent Māori and Pacific educational experiences. Rather they are indicators of a tertiary system (and society) that is based on European philosophical traditions and practices which contrast starkly with the cultural worlds of Māori and Pacific students. Furthermore, change is slow, even though universities are required to meet Treaty of Waitangi obligations, equity requirements and be responsive to Māori and Pacific communities. Gorinski and Abernethy (Gorinski and Abernethy 2007) argue for a "paradigm shift in current ways of thinking and practice" to address Māori student retention and success. They consider that a change from the current "deficit focus" on Māori attrition and underachievement to a critical understanding of the importance of relationships and pedagogy in Māori success is urgently required. In the context of Samoan university students, Penn echoes this call (Penn 2010).

International experience in minority tertiary education

There is a plethora of international literature which attests to historical inequalities in indigenous and minority student success in higher education, and which articulates reasons for those inequalities. The institutional response has generally been inadequate: indigenous and minority students continue to be under-represented in higher education, particularly in science (Snively and Williams 2006), are less likely to persist in their studies, and have lower completion rates. Consequently there is a lack of indigenous and minority people with advanced degrees to bring balance to the knowledge in the academy, to develop a real presence in the academy, and ultimately to fulfil indigenous and minority aspirations (Barnhardt 2008; Pidgeon 2008). High school success (Tierney and Jun 2001), parental educational background (Cabrera and La Nasa 2001), first generation status (Fischer 2007; Pascarella et al. 2004; Rowan-Kenyon et al. 2008), entry qualifications (Cabrera and La Nasa 2001), preparedness and planning (Cabrera and La Nasa 2001; Perna and Titus 2005), the first year college experience (Kim and Sax 2009; Reason et al. 2006), subject choice (Simpson 2001), student motivation and engagement (Greene et al. 2008; Krause and Coates 2008; Pike and Kuh 2005), student peer relationships (Kuh 1995), and the importance of role models (Peeler and Jane 2005) have all been found to have a causal link to student success.

In more recent times, as has happened in New Zealand, research focus has turned from integrating indigenous and minority students into the culture of the university to looking at the institution itself and how it is implicated in which students succeed. This body of

research attests to the multiple and layered contexts within which both students and universities operate and are shaped, and the implications this has for institutions in addressing the inequalities that exist. A strong feature in this body of work is the cultural and social mismatch between students and their families and the institution. High dropout rates and low achievement levels of indigenous students is not due to their inability to adjust, to genetic inferiority, cultural impoverishment or differences but rather lies in cultural discontinuity (Agbo 2001). It is difficult for students to stay true to themselves in an environment that does not fit their lived realities (Pidgeon 2008; VanEvery-Albert 2008). In this context indigenous peoples call for culturally relevant and responsive curriculum and pedagogies in the academy (Agbo 2001).

Rowan-Kenyon and co-authors (Rowan-Kenyon et al. 2008) argue that since parents are influential in the college attendance and success of their sons and daughters, colleges need to reframe what they do and create structures and practices that acknowledge the cultural and social location of students and their parents. Rather than students and their families changing to fit the institution, these authors urge institutions to change to better reflect their students. Tierney and Jun (Tierney and Jun 2001) evaluated a college preparation programme called the Neighbourhood Academic Initiative that was established for students considered at risk from dropping out of high school but who were keen to learn. The programme was built on the notion of cultural integrity (Deyhle 1995) that is defined "as those programmes and teaching strategies that call upon students' racial and ethnic backgrounds in a positive manner in the development of their pedagogies and learning activities" (Tierney and Jun 2001). The success of the programme hinged on the relationships and structures that that were built "across multiple constituencies" of the students, their families, the community in which they lived, educators, and tertiary institutions. Thus, it is important for students to stay connected to their families and communities when they embark on their studies (VanEvery-Albert 2008). Families need to be actively involved in the social and cultural affairs of the campus (HeavyRunner and DeCelles 2002). They also call for replicating the extended family structure in the college as it enhances the sense of belonging of students which ultimately leads to higher retention rates.

An important component of minority student experiences on campus are the formal and informal relationships they develop on campus. They are especially important because of the value that indigenous people place on them. Underpinning relationships are shared reciprocal obligations and responsibilities. In the learning environment it is through collective and collaborative relationships that knowledge is contextualized and understood, yet in the academy knowledge is founded on individual enterprise (Baskin et al. 2008). According to Fischer minority student participation in informal social activities such as study groups was positively related to their GPAs. Moreover, she found that the more connections minority students have on campus, both formal and informal, the less likely they were to leave college early (Fischer 2007). Mentoring, an example of a formal activity, not only benefits the students but also benefits the whole college community (Peeler and Jane 2005). Mentees benefit from shared learning and establishing friendships, faculty members benefit because of their greater understanding of learning, the college community benefits because of the increased diversity on campus and finally the mentors, usually senior students, benefit personally and professionally. In addition, it has been suggested that students who focus on completing their studies so that they can assist their communities are more successful in finishing college than those who concentrate on individual achievement (Brayboy 2004; Waterman 2004).

The way institutions allocate their funding has an impact on student engagement and learning outcomes. If institutions are concerned to increase the participation of minority and indigenous students then they need to provide both financial and moral support for student-centred policies and programmes (Pike et al. 2006). As Pike et al. note "[a]t the very least, why and where an institution invests its resources may make a non-trivial difference in the message it sends about institutional priorities and values". It is no longer sufficient for universities to just recruit minority and indigenous students and then expect them to conform to the cultural contours of the institution (Greenwood et al. 2008).

There is a body of evidence that suggests the assimilative culture (Huffman 2010), and particularly the racial climate (Fischer 2007; Sonn et al. 2000) of the college, affects the experiences of minority and indigenous students. For example, it was found that a climate of discrimination and prejudice negatively affected the commitment of African Americans to the institution (Cabrera et al. 1999). A phenomenological study that looked at the experiences of Black undergraduate students documented the "unfairness, sabotage and condescension" that they experienced everyday in their learning environment (Davis et al. 2004). One of the recommendations they make is that cultural competency training should be mandatory for administration and faculty members. In arguing that "these real barriers need to be taken seriously", Sonn et al. also call for universities to attend to their culturally-bound policies and practices including cultural awareness training because it "is essential that we critically look at the dominant culture and history because disadvantage and inequality have historical and social roots". Specifically faculty members need to understand that their racialised identities influence the discourse of race and privilege which is played out in classrooms (Frank 2003).

The situation confronting American Indian and Alaska Native students (particularly men) has been reviewed by Brayboy (2006), who proposed a number of institutional policy recommendations in order to improve the dismal rates of participation of indigenous peoples in higher education. He argued that these institutions should honestly explore the manner in which they may be hostile towards indigenous people by asking about their experiences, what leads to their success, and what could institutions do differently to better meet their needs.

Āwhina

In 1999 the Faculty of Science established an equity area with a strategic goal to produce Māori-Pacific scientists and technologists. Āwhina was the vehicle to achieve that goal. This decision arose from the desire of Faculty of Science (later joined by the Faculty of Architecture and Design) staff to engage with Māori-Pacific communities in research, teaching and learning, and to address educational and social inequities by significantly improving the Māori-Pacific "presence" in science careers. Āwhina evolved rapidly to become the on-campus whānau for Māori-Pacific students enrolled in Faculties of Science and Architecture and Design degrees and majors. Āwhina was established by, and remains the responsibility of, the Deputy Dean (Equity) for the Āwhina Faculties who, importantly, is a member of its senior management team.

The overall goal of Āwhina is to foster Māori-Pacific development and leadership. Its kaupapa (values base) of high expectations, high aspirations and high achievements, collective success and reciprocity, and success in two worlds provides the foundation to achieve that goal. The Āwhina kaupapa rather than whakapapa approach enables

non-Māori and non-Pacific students to contribute as whānau members and creates a vibrant, diverse, and inclusive whānau environment.

Āwhina has a flat structure where everyone is equally important. All whānau members accept and treat one another respectfully and work collectively and individually for success. From their first year at VUW, all whānau members are expected to strive for high grades, complete their degrees within the allocated time, and aspire to postgraduate studies. They are encouraged and assisted to develop leadership skills and to understand their role as culture changers within the university, workplace, and community.

Mentors and mentees are central to the ongoing existence and success of Āwhina. They (and their whānau) are nurtured both formally and informally by senior student and staff mentors, and career and community mentors. In turn, mentors focus on building academic momentum in first and second year mentees and ensuring the continuation of Āwhina by training mentees as mentors. Mentors are high achievers in their subject area, often final year undergraduates or postgraduates, and perform their roles voluntarily. Their primary role is to provide on-call academic help in their specialty subjects, assist first year mentees transition from high school to university, and academically strengthen first- and second-year mentees. Āwhina mentors are likely to have come from a similar background to their mentees and can often relate to pressures unique to Māori and Pacific students. Senior mentors have designated responsibilities for the day-to-day running of various aspects of Āwhina such as whānau room compliance, outreach, mentor support, special events, the Āwhina library, monitoring Āwhina progress, or scholarships. When these responsibilities are particularly significant to the functioning of Āwhina, they receive a modest stipend. All mentors are expected to be positive role models at all times, support one another, and provide leadership. Their Āwhina experience is accepted as preparation for future leadership roles in the workplace and in Māori and Pacific communities and organisations.

At the beginning of each trimester, a report containing Māori-Pacific student details is extracted from the central student database. Mentees are identified and allocated by degree major to mentors who then contact their mentees and set up a time to meet kanohi ki te kanohi (face to face). Mentees are encouraged to use the Āwhina whānau rooms (see later) during the day when not in lectures, laboratories or tutorials so they can easily access help. Following that first meeting, mentors maintain regular contact with mentees through weekly study sessions in the whānau rooms, and by phone or email. As well as providing subject-specific academic help and information, mentors also assist mentees to develop good study habits and skills, and run regular weekly sessions for other courses where they have expertise. Mentors are the first point of contact for their mentees and act as an 'early alert system' for all mentees. Mentees are expected to focus on their academic work while on campus, keep in contact with their mentors, work together in the whānau rooms, ask for help when they need it, and support other whānau members. This makes whānau rooms busy workplaces where at any one time there can be individual or group study, tutorials run by mentors or staff, mentors working with their mentees or mentees working together. Exam preparation sessions for all first- and second-year mentees are held in the 2 weeks preceding exams.

Āwhina has two components: on-campus and outreach. The outreach component is secondary school or community based. Since 2001, Āwhina mentors have assisted Māori-Pacific pupils in local low- to mid-decile (school decile rating indicates the extent to which it draws its students from low socio-economic communities; low decile schools have higher proportions of students from low socio-economic communities) secondary schools to raise their aspirations and achievements in science, technology and mathematics. Participating schools have high Māori and Pacific enrolments, are supportive of their

pupils, involve whānau in pupil education, and have designated staff to liaise with the on-campus component of Āwhina. Mentors meet with teachers, pupils and their whānau, and make several visits to school each week to work in class with school pupils. Conversely, pupils and whānau visit the VUW campus for 'hands-on' science sessions in the laboratories to experience first-hand the excitement of scientific discovery and the relevance of science to their everyday lives.

Since 2001 Āwhina has also been active in a wide range of rangatahi (young person) or whole whānau (all age) community based 'hands-on' outreach activities in venues such as community halls, rugby clubrooms, art galleries, event centres, Parliament, urban and rural Mārae, or even outside on beaches. These activities are one to four days in duration with tens to thousands of participants of all ages. The rationale for these events is to promote science and technology as areas in which Māori-Pacific already participate successfully, to encourage rangatahi to undertake science and technology and architecture and design degrees, and to provide an opportunity for mentors to strengthen connections with, and contribute to, their communities.

An Āwhina website created and maintained by staff and mentors connects the on-campus and outreach components, keeps whānau members updated on Āwhina developments and raises the profile of Āwhina in the wider community (see www.vuw.ac.nz/science/awhina).

Āwhina brings the whole whānau together for significant events including an annual birthday celebration where summer research results are presented, whānau successes such as degree completions, scholarships secured, and outreach results are acknowledged. Mentors organise and run these occasions which are usually held at the university Mārae and attended by mentors, mentees, their off-campus whānau (grandparents, parents, partners, children, friends), staff, community and institutional supporters. These events strengthen commitment to the goals of Āwhina and reaffirm the kaupapa that underpins the progress that has been made.

The Āwhina budget is modest, covering the wages and operational costs of between 1 and 2 full time staff, together with Āwhina Awards, casual staff, travel, and Āwhina functions. Costs associated with the four whānau rooms are covered by the Āwhina Faculties. All seven Schools of the Āwhina Faculties contribute to resourcing Āwhina. Each School has a contact staff member for Māori-Pacific students, but most staff are easily accessible and work with mentors and mentees in their offices or in the whānau rooms. Staff donate text books to the Āwhina library, provide references for employment, assist with applications for scholarships, fund and/or supervise Āwhina summer researchers, attend Āwhina celebrations, participate in outreach activities, and assist students experiencing personal, financial or academic difficulties. Increasing numbers of staff in the wider VUW community also support Āwhina students. For example, the authors of this paper are associated with the Āwhina Faculties: Wilson, Hunt, L Richardson are staff, Phillips and K Richardson are VUW Adjunct Fellows, and Challies is a senior Āwhina mentor. All donated time to assist with data analysis and co-author Āwhina reports.

Much of the formal on-campus mentoring takes place in the four Āwhina whānau rooms the first of which was established in 2001. Whānau rooms are secure spaces with continuous 24 hour, 7 day access where students can use resources such as computers and printers (with free printing) that are not available to them off-campus. Whānau rooms are a key part of the campus experience for Āwhina members because they bring students together within their peers to create support networks. Whānau rooms are physically located within Schools (discipline-specific clusters within the Faculties) to enhance the relationship between Āwhina whānau members, staff and other students.

From 2000 to 2004, annual Āwhina Awards for students in at least their second year of undergraduate study were awarded by a committee comprising the Deputy Dean (Equity) and one academic staff representative per School. In 2005 these were replaced by Summer Research Awards for second year Āwhina undergraduates. A small number of VUW Awards are offered specifically for Māori-Pacific students. Āwhina students are encouraged and assisted to apply for generic scholarships and Māori/Pacific-specific scholarships such as iwi Trust Board Awards, Māori Education Trust Awards, and Government-funded internships and prestigious Government-funded awards such as Te Tipu Pūtaiao Māori Fellowships for postgraduate research. Since 2002, the Deputy Dean (Equity) has worked closely with a number of sponsors, particularly the Māori Education Trust, on targeted scholarships to grow the postgraduate pool. Scholarships have played an important role in strengthening Āwhina at undergraduate level and growing postgraduate numbers. In the period 1999–2005 Āwhina students secured scholarships worth a total of New Zealand $1.6 million, 90% of which was nationally contested.

Growing the Āwhina postgraduate pool became a focus in 2004. Āwhina postgraduate students are encouraged to support one another and work more closely with staff. They launched and co-ordinated the fortnightly Āwhina Postgraduate Seminar Series which provides a whānau forum where research is critiqued and cross-disciplinary synergies explored prior to presentation at seminars and conferences. Research experiences are shared and problems associated with poster production, and data collection and analysis jointly resolved.

Āwhina resources include a well stocked library of prescribed textbooks and relevant theses, Āwhina summer researcher reports that can be borrowed, past exam papers that can be copied, and quiet individual and group study spaces within the four whānau rooms which have PCs, printers, and free printing.

Since inception, Āwhina has acknowledged the critical importance of developing a strong evidence-base with which to quantify its progress. Selected absolute and relative measures of recruitment, retention and progression used for this purpose include grade point averages, undergraduate and postgraduate degree completions, together with Māori, Pacific and gender comparisons. A database of information from the VUW central student database is used for trend analyses. This is supplemented by the biennial Āwhina survey which captures the perceptions of whānau members about their on- and off-campus experiences.

Methodology

As noted above, data used in this study came from two sources: survey and VUW student administrative data. Surveys of Āwhina students enrolled in courses within the Āwhina Faculties were used to identify factors that might affect their retention and academic success. Since 1999, Āwhina students have been asked to complete a survey questionnaire biennially. They were informed of the questionnaire by word-of-mouth, email, and notices placed in the whānau rooms. The questionnaire, comprising a mix of open and closed questions, surveyed student views about their lives both inside and outside of the university, the impact of their university study on their lives now, and potential impacts in the future. The questionnaire was anonymous and participation voluntary. Questionnaire sections included demographic information, academic interest, financial issues, learning support, Āwhina, off-campus resources and activities, and future educational goals. Results

from the surveys presented below focus on student first generation status, Āwhina resource use, staff understanding of Māori and Pacific culture and beliefs, peer support and student satisfaction, and future plans.

Based on methodological similarity, comparisons between the 1999 (n = 47) and 2005 (n = 92) surveys were deemed more appropriate than comparison with intervening surveys and, given the inter-survey gap, provided a better picture of change over the 6-year period. In some cases, however, responses to questions from the 2001 survey (n = 26) have been used when they were not asked in 1999. Percentages reported below were based on the number of students with the opportunity to answer, not the actual number who did answer.

Additionally, information from records held by the VUW student database was used to provide a descriptive analysis of trends in enrolments and academic outcomes since 1999. The database contains personal, demographic, course, grade, enrolment, and entry status (direct entry from school, or special admission for adult students) for every past and present VUW student. The data are collected for internal administrative and external reporting purposes. Only information specific to the Āwhina Faculties was used in this study. Since the number of Māori-Pacific students was relatively small, these data were carefully checked to ensure that all Māori-Pacific student records were included and correct.

Ethical advice and approval for the use of student records and survey data were sought and received from the VUW ethics committee.

Results

We present results in two sections, reflecting the different data sources used: Āwhina student surveys and academic outcomes from student record data.

Āwhina surveys

Of the 47 participants in the 1999 survey, 36% indicated that they were the first in their family to attend university and 75% were the first in their family to study science (see Table 1). First-generation students rated their pre-enrolment knowledge about university as lower ($t(45) = -2.49$, $p < 0.05$) than those with other family members who had attended university. This pattern was repeated when students rated family understanding of university study ($t(45) = -2.57$, $p < 0.05$).

Family understanding was similarly related to whether the student was the first to study science ($t(45) = -2.52$, $p < 0.05$). Of the 92 participants in 2005, 39% were the first in their family to study at university and 71% were the first in their family to study science, architecture, or design. As in 1999, those who were the first to attend reported significantly lower levels of both family understanding ($t(86) = 2.84$, $p < 0.01$) and personal prior knowledge ($t(86) = 3.48$, $p < 0.001$) than did students who had a relative attend previously.

Use of Āwhina whānau room resources

In 2005, students reported significantly less access to off-campus resources compared with students in 1999. Approximately one-third of students had no off-campus access to a computer, printer, quiet study space, or the internet. In 2005, only 13% reported that they

Table 1 Number and proportion (%) of survey responses to selected questions

	1999	2001	2005
First in family			
To attend University	17 (36%)		36 (39%)
To study Science	35 (75%)		65 (71%)
Āwhina room resource use			
Computers		16 (35%)	87 (95%)
Printers		16 (35%)	68 (74%)
Tutorials		13 (27%)	49 (53%)
Textbooks		7 (15%)	19 (21)%
Exam papers		6 (12%)	17 (18%)
Staff understanding of			
Māori-Pacific beliefs/culture	14 (29%)		47 (51%)
Māori-Pacific beliefs/culture relevant to study	11 (24%)		45 (49%)
Ease of approaching			
Tutors[a]	25 (53%)		66 (72%)
Lecturers[a]	21 (44%)		52 (57%)
Never/hardly ever approach staff	22 (47%)		26 (28%)
Peer support, satisfaction and academic identification			
Friends in all classes	11 (24%)		40 (44%)
Academic help from friends	20 (42%)		53 (58%)
Time studying with friends outside of class	9 (20%)		40 (44%)
Satisfied with chosen Science courses	33 (70%)		76 (83%)
Future plans: postgraduate study			
Finances an impediment		11 (43%)	52 (57%)
Grades an impediment		15 (57%)	30 (32%)

[a] Sum of 5, 6, and 7 responses on 7-point scale

did not make use of any of the four whānau rooms. Table 1 highlights the increased use of Āwhina resources from 2001 to 2005 (data not available for 1999). Āwhina tutorial attendance almost doubled in this time.

Perceptions of staff understanding

Students in 2005 were significantly more positive about their perception of staff understanding of Māori-Pacific beliefs and culture, particularly those aspects relevant to their studies, than in 1999 ($t(130) = 3.18$, $p < 0.001$, and $t(127) = 3.51$, $p < 0.001$, respectively). They reported it was easier to approach tutors than did 1999 respondents, and were significantly more comfortable approaching lecturers and tutors for help: in 1999 47% of students reported never or hardly ever approaching staff for assistance, compared to a significantly smaller proportion (28%, $p < 0.001$) in 2005.

Only 27% of students reported attending Āwhina tutorials in 2001 (data not available for 1999), compared to just over 50% in 2005. The mean rating by students for ease of approaching tutors increased significantly ($t(133) = -2.45$, $p < 0.01$) between 1999 and 2005.

Balancing family and university commitments

Students rated how much time they thought they could devote to their university work while off campus, and how well they thought they balanced family and study commitments. Mean ratings for both questions were not significantly different between 1999 and 2005 ($t(127) = -0.92$, $p = 0.36$ and $t(127) = -0.92$, $p = 0.36$). Students who reported having more time available for study also reported an easier family-university balance ($t(81) = 0.54$, $p < 0.001$).

Peer support, satisfaction and academic identification

Twenty-four percent of respondents reported having friends in all classes in 1999, and by 2005 this figure had risen significantly to 44% ($p < 0.005$). Students also rated the amount of academic help they received as greater in 2005, compared to 1999 ($t(135) = -2.37$, $p < 0.01$), and reported working more with other students in 2005 ($t(136) = -2.65$, $p < 0.005$). Students reported a high level of satisfaction with their papers throughout the series of surveys. The number of students reporting satisfaction in their courses had increased from 70% (1999) to 83% (2005) respectively. Students were also asked (free response) why they chose a degree or major in the VUW Āwhina Faculties. In contrast with 1999 (0%), 7% of 2005 respondents cited specific support for Māori-Pacific students, and 28% of 2005 respondents raised kaitiakitanga issues (guardianship of resources) as reasons why they chose to study science, architecture and design at VUW.

Future plans

In 2005, 30% of respondents said that continuing to postgraduate study was important. Of these 57% felt that finances would be an impediment to further study, while 32% were concerned that their grades would preclude this. However, in 2001 (data not available in 1999) 43% worried about finances, but 57% were concerned about their grades. Thus, students may have perceived their grades to be improving.

Academic outcomes

Recruitment and retention

Since 2000, Māori-Pacific science degree (BSc) enrolments increased by 28%, largely due to an increase in female student numbers (Fig. 1). A comparison of Māori-Pacific student enrolments over this period with enrolment of all BSc students suggest that the increase in Māori-Pacific enrolments did not reflect an increase in science enrolments per se. Over the same period, the proportion of Māori-Pacific students entering VUW with bursary or scholarship (university entrance qualifications) did not increase (nationally, the proportion actually declined), and the survey results suggest that the proportion of first-generation students did not change either.

Another significant indicator for Māori-Pacific student success in science was the numbers that have progressed to postgraduate studies. Figure 2 shows that between 2002 and 2005 there was an almost two-fold increase in the number of Māori-Pacific science postgraduate enrolments, and the beginnings of an upward trend in postgraduate

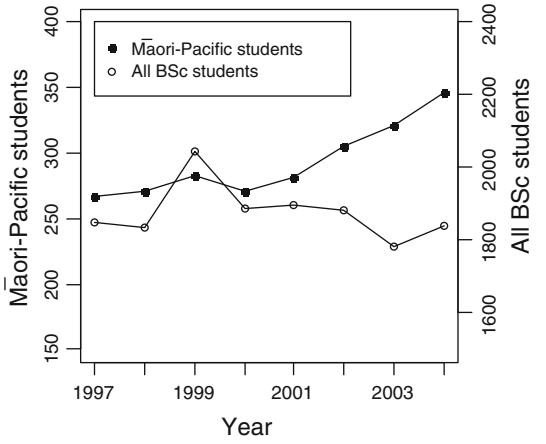

Fig. 1 Number of all, and Māori-Pacific, students enrolling in a BSc from 1997 to 2004

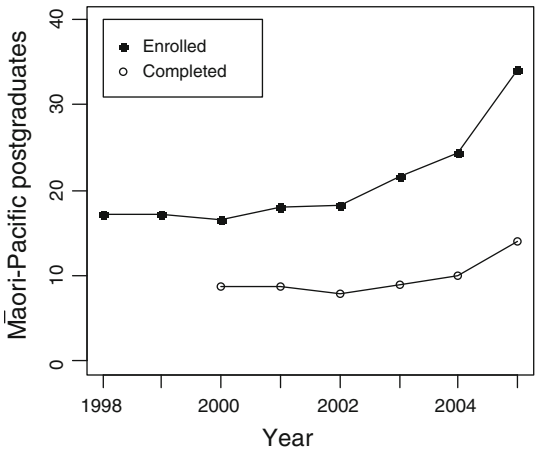

Fig. 2 Three year moving average of the number of enrolled and completed Māori-Pacific science postgraduates (completed postgraduates numbers for 1997 and 1998 not available)

completions. Furthermore, the three-year moving average for 2008 (not shown in Fig. 2) rises to 20, showing that the upward trend in completions has been sustained.

Academic achievement

Grade Point Average (GPA) is one measure of university academic achievement. Figure 3 shows the mean GPA of all Māori-Pacific students by gender. Despite the decline in the proportion of Māori-Pacific students entering university with bursary and scholarship school qualifications, the overall GPA for Māori-Pacific students continued to improve after the introduction of Āwhina. The most noticeable increase was from the period 1997–1999 to 2000–2002 that represented the first few years of Āwhina.

The increase between these two periods was significant ($t(877) = -1.98$, $p < 0.05$). Although the observed increase from the 2000–2002 to 2003–2005 period was not significant ($t(932) = -1.36$, $p = 0.17$), it was perhaps a reflection of the plateau in female GPA between the second and third periods after the initial increase in female GPA.

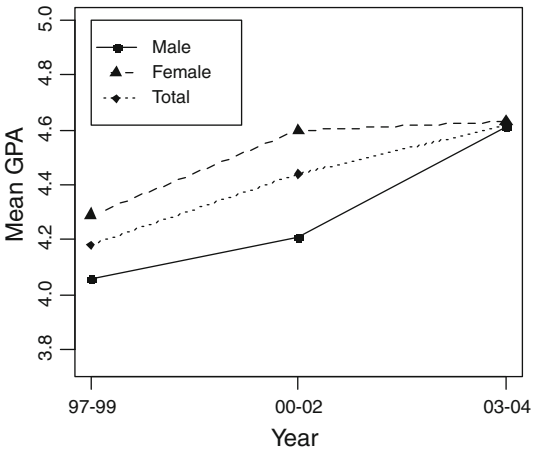

Fig. 3 Mean GPA for Māori-Pacific, and male and female Māori-Pacific students by period

Additionally, the proportion of 'B' and better grades achieved by Māori-Pacific students improved from 32% (in 1999) to 41% (in 2005).

This analysis is consistent with the perceived improvement in grades that emerged from the Āwhina surveys. However, there was a concurrent general increase in undergraduate GPA throughout the university, and without a suitable control group it is hard to be certain about the underlying drivers. One possible comparison would be between mentors and mentees since mentors had all themselves been mentored in the 2000–2004 period, and mentees may have received less mentoring. An additional analysis compared mentor and non-mentor GPAs for those years, after controlling for mentor GPA in the year prior to selection as a mentor. While non-mentor GPAs were generally less than mentor GPAs the differences were not significant, though the power of the test was limited given the small number of mentors.

Summary

Persistent ethnic disparities in academic success at tertiary level, particularly in science, have been noted in several countries. These disparities are often associated with factors such as low socio-economic status and entry qualifications, first generation status, lack of peer and staff support, institutional culture (e.g., racism), lack of access to suitable financial support, and lack of institutional commitment. Between 1997 and 2004 in the biological sciences for example, most US institutions made no significant gains in student persistence and graduation: the proportion of non-Asian minorities did not exceed their growth in the population (Lewis et al. 2009). Disparities are larger at postgraduate levels (Severiens and Wolff 2008), and there are concerns about future prospects for improvement, including pressure to publish, lack of reward for education and retention, anti-affirmative action sentiments, and a growing tendency for universities to prefer students from high income families because they are more likely to succeed (Kuh et al. 2006; Severiens and Wolff 2008).

Māori and Pacific (and low-socio-economic status) students in New Zealand arrive at university with similar risk factors as non-Asian minorities in the US, Canada and Australia, and New Zealand institutions have generally been no more successful than their

international counterparts. Thus, Pākehā are more likely (than Māori-Pacific) to achieve good entry qualifications and high first-year GPAs. In contrast, relative to Pākehā students, Māori-Pacific are more likely to study Arts subjects, be first generation students, and achieve poorer first year grades.

However, there is general agreement in the literature about techniques that institutions can use to improve tertiary success rates such as fostering interactions with staff, encouraging peer interactions (e.g., tutoring, teaching, mentoring), providing good first year programmes (bridging, tutoring, study groups), early warning systems (including networks involving staff, peers, mentors), academic support, and high staff expectations (e.g., Kuh et al. 2006).

In at least one study at a New Zealand university, school and individual characteristics were found to be more important for low achievers (Shulruf et al. 2008). In another study, the relationship between entry qualification and tertiary success was found to be less strong for Māori-Pacific students (Juhong and Maloney 2006). Importantly, these authors have also shown that even after controlling for background Māori-Pacific students still do not achieve the grades reported for other groups. In both studies, the authors argued that targeted interventions in the first one or two years would be the most effective way of improving Māori-Pacific success. For Pacific students, the presence of Pacific staff (both academic and non-academic), Pacific programmes (e.g., mentoring, leadership tutorials) and events, role models (e.g., family, mentors, older students) have been cited as important to success at tertiary level (Benseman et al. 2006). The importance of countering the alienating effects of an unfamiliar university culture has also been noted (Davis et al. 2004; Fischer 2007; Penn 2010; Phillips 2003; Sonn et al. 2000).

It has been argued that the most important factor to promote tertiary success is peer support (Kuh et al. 2006), particularly for under-represented minorities in science, and this concept of manaakitanga (nurturing that is beneficial and reciprocal) is central to the Āwhina kaupapa. Thus, mentors provide continuous academic help to first and second year mentees, with much (though not all) of the peer-to-peer interaction occurring face-to-face in dedicated whānau rooms. In fact Āwhina significantly extends the concept of peer support to a unified on- and off-campus whānau approach—in effect a distinct and Māori/Pacific-friendly culture within, but closely linked to, the larger community of the Āwhina Faculties. This approach is consistent with the conclusions of a number of researchers (Brayboy 2006; HeavyRunner and DeCelles 2002; Penn 2010; Phillips 2003; Pidgeon 2006; VanEvery-Albert 2008). Crucially, Āwhina also insists on high expectations, high aspirations, high achievements, hard work, collective success and reciprocity, and achieving success in two worlds.

A consistent response in the 1999 and 2005 surveys was that many respondents were not only the first in their family to go to university, but also the first to study science, architecture, or design degrees or majors. Consequently there was often relatively low family understanding of the demands of academic study. More positively, despite these persistent risk factors, there was a perception amongst Āwhina students that staff in the Āwhina Faculties had an improving understanding of Māori-Pacific culture, and how that culture might affect their study. There was also a decline in the difficulty that Māori-Pacific students reported in approaching lecturers and tutors for assistance.

The reported use of whānau rooms increased substantially in the period 2001–2005. For example, Āwhina tutorial attendance almost doubled, as did the number of Māori-Pacific students who reported having friends in their classes. Some of the increased usage may, however, have been driven by the reported decline in access to off-campus study resources. Over the same period, students reported increasing satisfaction with their courses and the

perception that their grades were a barrier to postgraduate study declined. Of note was the fact that for the first time in 2005, some students identified Āwhina as an important reason for choosing to study at VUW. Additionally, a significant number of students reported kaitiakitanga issues as being important reasons for studying science, architecture and design at VUW.

There was a substantial increase in Māori-Pacific enrolment into VUW science degrees, a trend that was different from overall science enrolments. The reasons for this are probably complex. For example, Middleton (Middleton 2009) reported an increase in Māori-Pacific tertiary graduates at sub-degree level, but some at degree level as well, though there is no information on national trends in science. Nevertheless, there is an interesting possible connection with Āwhina Outreach, and with increasing concerns around kaitiakitanga. More significantly, there was both an increase in mean undergraduate GPA and in enrolment to postgraduate study, even though over the same period there had been no increase in Māori-Pacific entry qualifications or proportion with first generation status. Furthermore, there has been a sustained and substantial improvement in the number of Āwhina postgraduate completions.

Limitations

Small total numbers of Āwhina students and limited resources hampered the survey analysis presented here, for example, age and sex of respondents was not asked for confidentiality reasons and it would have been useful to include questions on socio-economic status and reasons for studying at VUW. Additionally, the purpose of the survey has changed slightly over the years: in 1999 it was important to determine student need. Subsequently, monitoring and analysis requirements increased in importance. The shortness of the time series was problematic for analyses based on student records. For example, the analysis of these data was restricted to a relatively simple study of trends in key indicators: the pre-Āwhina period has been excluded, and confounders such as entry qualifications, gender, socio-economic status, first generation status, and age were not controlled in the results presented here.

Discussion

Survey results suggest that over the period 1999–2005 Māori-Pacific students typically entered the Āwhina Faculties with some of the risk factors identified in the literature, such as first generation status and lower entry qualifications. However, by 2005 there were signs of increased Māori-Pacific student engagement in successful behaviours, consistent with the culture-change embodied by the Āwhina whānau approach: increased use of Āwhina resources, more interactions with staff, perceptions of improving staff understanding of Māori-Pacific culture, increased attendance at tutorials, increased academic assistance, increased satisfaction with courses, and a decreased perception that grades were a barrier to postgraduate study.

There was also an increase in the responses identifying the importance of Āwhina in choosing VUW as a desirable place to study. Āwhina's outreach component may have helped the increase in science degree enrolments since it has raised the profile of tertiary science within Māori-Pacific communities, provided direct mentoring assistance to, and positive role models for, secondary science pupils, and provided opportunities for mentors to contribute back to their own and other communities. Nevertheless, given the increase in

Māori-Pacific tertiary level enrolments, the contribution of Āwhina outreach to the upward trend in enrolments remains a subject for future research.

Measureable improvements in undergraduate mean GPA occurred during the 1999–2005 period, and perhaps more importantly, substantial growth in securing postgraduate study awards, and sustained improvement in Āwhina postgraduate completions. These trends are consistent with key elements of the Āwhina kaupapa, and its realisation in e.g., mentoring (as a mentee or mentor), outreach, tutoring, and particularly its high expectations around grades, aspiration for postgraduate study, and collective success and reciprocity. However, they are not typical of national trends (Gorinski and Abernethy 2007). While not yet definitive, the evidence presented here is an important first step in confirming a significant Āwhina effect, and further research is in progress to strengthen that evidence. This future work will draw on data from continuing student surveys, and repeated cross sectional and longitudinal analysis based on a much longer time-series of student record data. In particular, controlling important confounders will be dealt with explicitly. The authors plan to extend this work across other non-Āwhina VUW Faculties, and eventually across other New Zealand universities.

While Māori and Pacific experiences mirror those of indigenous and minority students elsewhere the key difference resides in the unique socio-cultural milieu in which Māori and Pacific students live. Indeed, Mason Durie (Durie 2003) writes while Māori may experience similar "fortunes and misfortunes … the distinguishing characteristic is not necessarily material hardship, or risk laden life-styles, or lack of motivation, or unsympathetic school environments or impaired access to education … the essential difference is that Māori live at the interface between te ao Māori [Māori world] and the wider global society". Āwhina is one interface that brings together te ao Māori, the Pacific world and western science to create a space within which Māori and Pacific students can flourish.

The focus for Āwhina beyond 2005 will be on meeting new challenges arising from wider social, environmental, and economic needs, the growth of whānau numbers at undergraduate and postgraduate level, maintaining connections with Āwhina whānau as they move into the workplace, and providing career and workplace mentors. The biennial survey will be extended to better understand the Āwhina postgraduate student experience.

Confirmation of an Āwhina effect would provide empirical support for many of the factors that reduce inequalities in tertiary (science) success, particularly around the issues of on-campus whānau, community connectedness, cultural alienation, peer support and interactions with academic staff. Lessons from the Āwhina experience would also provide a nuanced perspective on those factors. Firstly, the kaupapa of the whānau environment, together with the calibre and commitment of its senior members, is critical. While the whānau need not encompass the entire institution, it must be accepted and supported by the disciplines in which it sits over an extended period of time. Thus, Āwhina is intimately connected with, and valued by, the Āwhina Faculties (staff and students) but has its own distinct "life" and it has been helpful that Āwhina has had senior Faculty staff directly involved in its everyday work. Secondly, the whānau must have the autonomy to decide its kaupapa, and the implementation of that kaupapa in its strategic and day-to-day work. Thirdly, the whānau must develop and maintain close connections with the communities from which it draws its members. For Āwhina, this is central to the kaupapa. Fourthly, postgraduate success will follow from the implementation of such a whānau environment. Fifthly, it is possible to reduce ethnic disparities in tertiary science without having academic staff from the under-represented groups (though it would probably help). In fact Āwhina is actively involved in "growing" such staff. However, as noted above, it is important that academic staff see themselves as part of the whānau. Finally, developing a

robust evidence base is critical. Designing and gathering the data that will provide such evidence is an on-going requirement from day one.

An Āwhina effect would also have important implications for the nature of tertiary institutions, their cultural and social disconnection with minority and indigenous students, and their social obligations and responsiveness. Exploring those implications in future research is a priority, along with understanding the consequences of contemporary developments for efforts to reduce disparities in tertiary education in New Zealand, such as the Performance-Based Research Fund which assesses staff research performance, and recently introduced enrolment restrictions.

Acknowledgments The authors wish to acknowledge Professors Peter Englert and David Bibby, Deans and Pro Vice Chancellors of the Faculties of Science and Architecture and Design for their support for Āwhina; David Bibby for reading an earlier manuscript and providing helpful comments and Matt Viliamu for contributing to early drafts of this paper. We would especially like to thank Geoff Goddard for providing the VUW student record data. This work would not have been possible without the support of all Āwhina whānau members, and we acknowledge and thank them for their contributions.

Conflict of interest The authors have no conflict of interests to declare.

References

Agbo, S. (2001). Enhancing success in American Indian students: Participatory research at Akwesasne as part of the development of a culturally relevant curriculum. *Journal of American Indian Education, 40*(1), 31–56.

Barnhardt, R. (2008). Indigenous knowledge systems and higher education: Preparing Alaska Native PhDs for leadership roles in research. *Canadian Journal of Native Education*, *31*(2), 154–166.

Baskin, C., Koleszar-Green, R., Hendry, J., Lavallée, L., & Morrin, J. (2008). We pass the talking stick to you: Forming alliances and identities in the academy. *Canadian Journal of Native Education*, *31*(1), 89–106.

Benseman, J., Coxon, E., Anderson, H., & Anae, M. (2006). Retaining non-traditional students: Lessons learnt from Pasifika students in New Zealand. *Higher Education Research & Development, 25*(2), 147–162.

Brayboy, B. (2004). Hiding in the ivy: American Indian students and visibility in elite educational settings. *Harvard Educational Review, 74*(2), 125–152.

Brayboy, B. (2006). Indigenous men in higher education. Background paper for The Joint Center for Political and Economic Studies, Washington, D.C.

Cabrera, A., & La Nasa, S. (2001). On the path to college: Three critical tasks facing America's disadvantaged. *Research in Higher Education, 42*(2), 119–149.

Cabrera, A., Nora, A., Terenzini, P., Pascarella, E., & Hagedorn, L. (1999). Campus racial climate and the adjustment of students to college: A comparison between White Students and African-American students. *Journal of Higher Education, 70*(2), 134–136.

Callister, P., & Didham, R. (2008). Emerging demographic and socioeconomic features of the Pacific population in New Zealand. *Pacific Interactions*, *13*, 13–40.

Coxon, E., Anae, M., Mara, D., Wendt-Samu, T., & Finau, C. (2002). *Literature review on Pacific education issues: Final report*. Wellington, New Zealand: Ministry of Education.

Davis, M., Dias-Bowie, Y., Greenberg, K., Klukken, G., Pollio, H., Thomas, S., et al. (2004). "A fly in the buttermilk": Descriptions of university life by successful Black undergraduate students at a Predominately White Southeastern University. *Journal of Higher Education, 75*(4), 420–446.

Deyhle, D. (1995). Navajo youth and Anglo racism: Cultural integrity and resistance. *Harvard Educational Review, 65*(3), 403–445.

Durie, M. (2003). *Mäori Educational Advancement: at the interface between te ao Mäori and te ao whanui* Hui Taumata Mätauranga Tuatoru. Taupo (2003).

Ferguson, P., Gorinski, R., Wendt-Samu, T., & Mara, D. (2008). *Literature review on the experiences of Pasifika learners in the classroom.* Wellington, New Zealand: Ministry of Education.

Fischer, M. (2007). Settling into campus life: Differences by race/ethnicity in college involvement and outcomes. *The Journal of Higher Education, 78*(2), 125–161.

Frank, A. (2003). If they come, we should listen: African American education majors' perceptions of a predominantly white university experience. *Teaching and Teacher Education, 19*(7), 697–717.
Gorinski, R., & Abernethy, G. (2007). Maori student retention and success: curriculum, pedagogy and relationships. *Handbook of Teacher Education*, 229–240.
Greene, T., Marti, C., & McClenney, K. (2008). The effort-outcome gap: Differences for African American and Hispanic community college students in student engagement and academic achievement. *Journal of Higher Education, 79*(5), 513–539.
Greenwood, M., de Leeuw, S., & Frase, T. N. (2008). When the politics of inclusivity become exploitative: A reflective commentary. *Canadian Journal of Native Education*, *31*(1), 198–207.
HeavyRunner, I., & DeCelles, R. (2002). Family education model: Meeting the student retention challenge. *Journal of American Indian Education, 41*(2), 29–37.
Huffman, T. (2010). Resistance theory and the transculturation hypothesis as explanation of college attrition and persistence among culturally traditional American Indian students. *Journal of American Indian Education, 40*(3), 1–39.
Juhong, B., & Maloney, T. (2006). Ethnicity and academic success at university. *New Zealand Economic Papers, 40*(2), 181–218.
Kim, Y., & Sax, L. (2009). Student–faculty interaction in research universities: Differences by student gender, race, social class, and first-generation status. *Research in Higher Education, 50*(5), 437–459.
Krause, K., & Coates, H. (2008). Students' engagement in first-year university. *Assessment & Evaluation in Higher Education, 33*(5), 493–505.
Kuh, G. (1995). Cultivating "high-stakes" student culture research. *Research in Higher Education, 36*(5), 563–576.
Kuh, G., Kinzie, J., Buckley, J., Bridges, B., & Hayek, J. (2006). What matters to student success: A review of the literature. Commissioned Report for the National Symposium on Postsecondary Student Success: Spearheading a Dialog on Student Success.
Lewis, J., Menzies, H., Nájera, E., & Page, R. (2009). Rethinking trends in minority participation in the sciences. *Science Education*, *93*(6), 961–977.
Middleton, S. (2009). Beating the filters of failure: Engaging with the disengaged in Higher Education. National Centre for Vocational Education Research (NCVER).
Ministry of Education. (2008). *Nga Haeata Matauranga 2006/07: Annual Report on Maori Education*. Wellington, New Zealand: Ministry of Education.
Ministry of Health. (2003). *Achieving Health for all People* http://www.moh.govt.nz/moh.nsf/pagesmh/2733?Open. New Zealand Ministry of Health.
Ministry of Social Development. (2009). *The social report*. Wellington, New Zealand: Ministry of Social Development.
Pascarella, E., Pierson, C., Wolniak, G., & Terenzini, P. (2004). First-generation college students: Additional evidence on college experiences and outcomes. *Journal of Higher Education, 75*(3), 249–285.
Peeler, E., & Jane, B. (2005). Mentoring: Immigrant teachers bridging professional practices. *Teaching Education, 16*(4), 325–336.
Penetito, W. (2004). Research and context for a theory of Māori schooling. In F. E. Jandt (Ed.), *Intercultural communication: A global reader*. Sage Publication: Thousand Oaks.
Penn, R. (2010). *Manumalo: a study of factors which facilitate success for New Zealand-born Samoan students at university*. Auckland University of Technology: Unpublished Master of Education.
Perna, L., & Titus, M. (2005). The relationship between parental involvement as social capital and college enrollment: An examination of racial/ethnic group differences. *Journal of Higher Education, 76*(5), 485–518.
Phillips, H. (2003). *Te reo karanga o nga Tauria Maori: Maori students - their voices, their stories at the University of Canterbury, 1996-1998*, unpublished PhD thesis, University of Canterbury, Christchurch, New Zealand.
Pidgeon, M. (2006). *It takes more than good intentions: Institutional accountability and responsibility to indigenous higher education*. BC: University of British Columbia.
Pidgeon, M. (2008). Pushing against the margins: indigenous theorizing of "success" and retention in higher education. *Journal of College Student Retention: Research, Theory and Practice, 10*(3), 339–360.
Pike, G., & Kuh, G. (2005). A typology of student engagement for American colleges and universities. *Research in Higher Education, 46*(2), 185–209.
Pike, G., Smart, J., Kuh, G., & Hayek, J. (2006). Educational expenditures and student engagement: When does money matter? *Research in Higher Education, 47*(7), 847–872.
Pool, I. (1991). *Te Iwi Maori: A New Zealand population past, present and projected*. Auckland: Auckland University Press.

Reason, R., Terenzini, P., & Domingo, R. (2006). First things first: developing academic competence in the first year of college. *Research in Higher Education, 47*(2), 149–175.

Rowan-Kenyon, H., Bell, A., & Perna, L. (2008). Contextual influences on parental involvement in college going: Variations by socioeconomic class. *The Journal of Higher Education, 79*(5), 564–586.

Scott, D. (2003). *Participation in tertiary education*. Wellington, New Zealand: Tertiary Education Group, Ministry of Education.

Severiens, S., & Wolff, R. (2008). A comparison of ethnic minority and majority students: Social and academic integration, and quality of learning. *Studies in Higher Education, 33*(3), 253–266.

Shulruf, B., Hattie, J., & Tumen, S. (2008). Individual and school factors affecting students' participation and success in higher education. *Higher Education, 56*(5), 613–632.

Simpson, J. (2001). Segregated by subject: Racial differences in the factors influencing academic major between European Americans, Asian Americans, and African, Hispanic, and Native Americans. *Journal of Higher Education, 72*, 63–100.

Snively, G., & Williams, L. (2006). The aboriginal knowledge and science education research project. *Canadian Journal of Native Education, 29*(2), 229–244.

Sonn, C., Bishop, B., & Humphries, R. (2000). Encounters with the dominant culture: Voices of Indigenous students in mainstream higher education. *Australian Psychologist, 35*(2), 128–135.

Statistics New Zealand (2007). *QuickStats about Maori*. Wellington, New Zealand: Statistics New Zealand.

Statistics New Zealand and Ministry of Pacific Island Affairs. (2010). *Demographics of New Zealand's Pacific population: Pacific progress 2010*. Wellington, New Zealand: Statistics New Zealand and Ministry of Pacific Island Affairs.

Tierney, W., & Jun, A. (2001). A university helps prepare low income youths for college: Tracking school success. *Journal of Higher Education, 72*(2), 205–225.

VanEvery-Albert, C. (2008). An exploration of indigenousness in the western university institution. *Canadian Journal of Native Education*, *31*(1), 41–55.

Waterman, S. (2004). *The Haudenosaunee college experience: A complex path to degree completion*. Teaching and Leadership-Dissertations and Theses, p. 50.