

Māori and Pasifika engineering students: Impact and contribution to their peers

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ABSTRACT

CONTEXT

In Aotearoa New Zealand (NZ), a distinct educational experience is offered to students by supporting and promoting the Māori and Pasifika culture in higher education. Students can engage with Māori and Pasifika students while studying through curricular, co-curricular and extra-curricular activities. The unique educational environment allows students to nurture intercultural learning where understanding the Māori and Pasifika culture is important to NZ engineering graduates as they are required to apply reasoning informed by cultural knowledge and issues when they practice their profession in NZ and the Pacific.

PURPOSE OR GOAL

The study investigated the potential impact and contribution of Māori and Pasifika to non-indigenous students while studying engineering at the university. The study attempted to answer two research questions: (i) In what ways do Māori and Pasifika engineering students potentially increase the awareness of non-indigenous students about their culture?, and (ii) How do the undergraduate Māori and Pasifika engineering students contribute to the profession of non-indigenous recent graduates who work on projects that require Māori and Pasifika engagement?

METHODOLOGY

This study conducted interviews and focus group studies of Part III/IV students and recent graduates of the Faculty of Engineering at the University of Auckland. All the transcripts of the interview and focus group sessions were systematically analysed. The analysis of the data underwent six phases of thematic analysis.

CONCLUSIONS AND RECOMMENDATIONS

This study demonstrates that Māori and Pasifika can have a positive impact on non-indigenous engineering students and contribute to the development of the skills necessary for their profession. It has been identified that there are many possible ways to increase awareness of engineering students about Māori and Pasifika culture namely, (i) teaching and learning activities, (ii) university-wide student support programmes, and (iii) Māori and Pasifika student-led initiatives. However, there are challenges and barriers in the student interaction and engagement between the Māori and Pasifika and non-indigenous students, such as the under-representation of Māori and Pasifika students in the Faculty of Engineering, The University of Auckland. Additionally, the lack of understanding of meeting the Treaty of Waitangi responsibilities, the negative experiences of Māori and Pasifika students, and the differences in culture and values need to be addressed. In this way, both indigenous and non-indigenous students would be more engaged and become culturally competent. When non-indigenous students are genuinely engaged with Māori and Pasifika students, they have a better understanding of the indigenous culture, values and practices. This can potentially be an asset to students when their profession requires Māori and/or Pasifika engagement.

KEYWORDS

Māori, Pasifika, indigenous

Introduction

Higher education institutions (HEIs) provide lifelong learning to students through their research-informed teaching and programmes. At the university, students can deepen and strengthen their relationships with other students, staff and the wider university community. HEIs can also support various activities for students to engage with their fellow students to enhance their student life, experience and learning. According to Gregersen-Hermans (2017), universities act as training grounds for students to have a good level of cultural awareness and understanding. The experience and interactions of students with other cultural groups ease their ability to work with diverse groups (Ward, 2001). The effect of intercultural learning has been documented in several studies where positive long-term changes in cognition, emotions and behaviour were demonstrated (Bennett, 2009; Dinges & Baldwin, 1996).

In NZ, a distinct educational experience is offered to students by supporting and promoting the Māori and Pasifika culture in higher education (University of Auckland, 2020a; University of Auckland, 2012). Students can engage with Māori and Pasifika students while studying through curricular, co-curricular and extra-curricular activities. The unique educational environment in NZ allows students to nurture intercultural learning. Hence university degrees such as Bachelor of Engineering (Honours) require Engineering New Zealand (ENZ) accreditation where one of the graduate attributes is to:

“Apply reasoning informed by contextual knowledge to assess societal, health, safety and cultural issues (including the principles of Te Tiriti O Waitangi) and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems.” (University of Auckland, 2021a)

Non-indigenous engineering students stand to benefit from engaging with their Māori and Pasifika peers. Although Māori and Pasifika students are under-represented in the Faculty of Engineering, they can potentially enhance the understanding of and increase awareness of their culture of non-indigenous students while at the university. They can also develop their ability to work in the wider NZ community particularly in projects or areas that require engagement with Māori and Pasifika communities. To the best of authors knowledge, there is no study on the impact and potential contribution of Māori and Pasifika engineering students to the learning experiences of their peers.

This study attempted to answer two research questions: (i) In what ways do Māori and Pasifika engineering students potentially increase the awareness of non-indigenous students about their culture? and (ii) How do the undergraduate Māori and Pasifika engineering students contribute to the profession of non-indigenous recent graduates who work on projects that require Māori and Pasifika engagement?

Methodology

Research Approach

Kaupapa Māori Research (KMR) approach is an established research methodology for Māori people, based on Māori aspirations, culture, practices and preferences (Bishop, 1999). On the other hand, *talanoa* is a qualitative research methodology that is ideal for Pasifika participants as it removes the barrier between the researchers and the participants through building a relationship. When conducting *talanoa*, Pasifika aspirations are defined and recognised while the Pasifika research preferences are developed and implemented (Vaiotele, 2006). However, this study involved Māori, Pasifika and non-indigenous participants. Because of the presence of non-indigenous participants, a KMR approach and *talanoa* were not used in the study even though there were Māori and Pasifika students involved. The study used a homogenous approach to all groups for consistency but ensured that all approaches were still appropriate and culturally sensitive to all participants. Additionally, the researcher was familiar with KMR and *talanoa* before conducting any interviews and focus group studies.

This study used a constructivist paradigm employing qualitative method to understand the impact and contribution of Māori and Pasifika students to non-indigenous students completing their engineering degrees at the University of Auckland. A constructivist paradigm is adopted because its ontology (the nature of reality) is “multiple, equally valid and socially constructed” while its epistemology (the relationship between the researcher and research participant) is interactive and “uncovers the deeper meaning and insights in participants lived experiences” (Ponterotto, 2002, p. 397). Additionally, a qualitative method is appropriate for this study because it attempts to understand the descriptions, narratives, and views of the participants about their experiences.

Data Collection and Analysis

All current Part III/IV engineering students and recent engineering graduates of the University of Auckland who completed their studies between 2018 and 2020 (inclusive) were invited to participate in an anonymous survey using Qualtrics to pre-screen the participants. Part III/IV students, who are in third and fourth year of completing their engineering degree, were considered as they have studied at the university for at least two years and may have developed relationships with their peers. Most of these students would also have taken at least two general engineering courses that embed Māori values and practices. The engineering graduates between 2018 and 2020 were considered for the study because they would most likely have a good recollection of their university student experience. They also have at least one year of experience working on engineering project/s in NZ.

All interviews and focus group studies (online and in-person) were recorded in Zoom and/or Microsoft Teams to record the interview and focus group sessions. Each interview and focus group were completed within 30 minutes. A combination of semi-structured interviews and focus groups was conducted. All the transcripts of the interview and focus group sessions were systematically analysed. The analysis of the data underwent six phases of thematic analysis (Braun & Clarke, 2006). The researcher transcribed all the recordings of the interviews and focus group study. The researcher read the transcripts at least three times to be familiar with the data. Once the researcher was familiar with the data, codes were generated and grouped into themes. Further, the themes were reviewed and refined until a final report of the research was produced.

Results and Discussion

Potential ways Māori and Pasifika engineering students increase the cultural awareness of non-indigenous students

In this study, many ways have been identified that demonstrate how Māori and Pasifika engineering students increase the awareness of other students about their culture and practices. Some of the interactions mentioned occurred in lectures, tutorials, meeting friends of friends, group projects, living in university residence halls, *Tuākana*, attending a UniGuide tour and joining SPIES activities. However, the participants' wide range of peers (1- 50 peers) while studying engineering could be attributed to many possible factors. The discussion to answer the first research question is categorised into three sections: (i) teaching and learning activities (ii) university-wide student support programmes and (iii) Māori and Pasifika student-led initiatives.

Teaching and learning activities

Attending lectures and tutorials and working on group projects have been the common reasons non-indigenous students meet Māori and Pasifika engineering students. Engineering students at the University of Auckland are introduced to group projects as early as Part I engineering course namely ENGGEN 115: Principles of Engineering Design. All compulsory general engineering courses from Part II to Part IV namely ENGGEN 204 (Professional Skills and Communication), ENGGEN 303 (Managing Projects and Innovation), ENGGEN 403 (Managing a Business) and capstone course also involve group projects (University of Auckland, 2021b). In the interviews and focus group studies, these courses are popular among the participants because they require group projects with a large number of students (University of Auckland, 2021b). The number of students per group can be as large as 30 when they reach the final year, simulating the industry team size and work.

Engineering courses employ collaborative learning because of its effectiveness in teaching and learning as well as the development of the soft skills of students. Previous studies have demonstrated the positive effects of collaborative learning among students. Collaborative learning enhances student learning, improves student satisfaction, develops and enhances critical thinking skills and develops attitudes and soft skills (Sulaiman & Shahrill, 2015; Terenzini, Cabrera, Colbeck, Parente, & Bjorklund, 2001; Gokhale, 1995). However, when working on collaborative engineering projects with up to 30 students, it is expected that students would have diverse cultural backgrounds. The Faculty of Engineering at the University of Auckland has a culturally diverse student population. When not designed and managed properly, this can be detrimental to student learning. It can lead to a lack of participation, demotivation, dissatisfaction and poor performance. Additionally, opportunities to develop connections, relationships and/or friends should be provided to students (van Gijn-Grosvenor & Huisman, 2020). Numerous studies have also demonstrated that diversity in higher education is beneficial to students because students learn to integrate multiple perspectives, increase student engagement, gain personal and intellectual growth, increase student satisfaction and enhance cultural

awareness (Umbach, 2006; Chang, 2002; Marin, 2000). As mentioned by G-MP-1, it is important that students work in a culturally diverse group because this may lead to the best possible solution as multiple perspectives are considered.

“...that's because I believe that diversity of thought is important even though it could be easier to work with people who come from the same worldview. It's not necessarily the best outcome because it's diverse in thought.” [G-MP-1]

University-wide student support programmes

The University of Auckland has multiple programmes available to all students to support and assist them to transition to university life. For example, a UniGuide tour is free and available to all new students. The current students orient and assist them to settle into university life. The tour usually involves a small group of new students who belong to the same faculty. In 2016, about 5000 students experienced the UniGuide tour (University of Auckland, 2021c). Hence, the UniGuide tour is a potential programme where non-indigenous students can meet future engineering Māori and Pasifika students before attending the first lectures and tutorials of new students. According to Mann, Andrews, and Rodenburg (2010), student orientation is the first opportunity for students to experience the social and academic environment of the campus. Students can start building social connections, especially in a small group during orientation. Moreover, longer first-year orientations create a stronger sense of belongingness, better academic achievement and a higher retention rate as compared to those who did not attend the orientation (Soria, Lingren Clark, & Coffin Koch, 2013). Similarly, this study found that, when students have a positive experience during student orientation, it led to a good impression and development of the participant's awareness or curiosity about other cultures.

Māori and Pasifika student-led initiatives

Among all the potential ways to interact with Māori and Pasifika students at the Faculty of Engineering, joining SPIES and participating in their activities would be the best way for non-indigenous engineering students to learn the Māori and Pasifika culture and values. SPIES provides social, academic and cultural support to its members as well as promotes engineering to Māori and Pasifika communities (SPIES, 2020). Although SPIES was founded to cater to Māori and Pasifika, it has activities available to non-indigenous students and staff where they can learn about Māori and Pasifika culture and values. SPIES practices the Māori value of *arohatanga* (love, respect and compassion) by treating each member like family and caring for each other. Pasifika are also known for their hospitality which allows other people to be embraced and felt to belong in the group. SPIES gives a sense of belonging to their members as well as to other ethnic groups. In a study conducted on the sense of belonging, it was identified that it is important for students to feel belongingness at the university followed by respect and acceptance (van Gijn-Grosvenor & Huisman, 2020). Moreover, social interaction with students in organisations and events contributes to feelings of belonging (van Gijn-Grosvenor & Huisman, 2020; Hurtado & Carter, 1997; Prebble, et al., 2004). Similarly, extracurricular activities like multi-cultural social evenings where students share their culture and stories are effective to improve their cultural awareness. This is like the finding of the study that attending cultural insight events in SPIES increased awareness of Māori and Pasifika values, history and language of non-indigenous students as narrated by G-NI-1

“Cultural insights...There's a shared lunch and a presentation for each country. So one week it might be Tongan cultural insights. Samoan cultural insights. And throughout several weeks we went through all the different countries and all the different cultures and the presentation. There's like history. A bit of history. A bit of language. Like a snippet of the culture.” [G-NI-1]

When such extra-curricular activity is combined with curricular activities, the student experience is better and a sense of belonging is strengthened (De Sisto, Huq, & Dickinson, 2021). SPIES, being inclusive to its members as well as to non-indigenous students, had a positive impact on a non-indigenous participant who experienced inclusivity in SPIES. The non-indigenous participant still values the experience and considers SPIES as the group that developed his/her engagement skills with Māori and Pasifika communities. G-NI-1 explained

“Even though I'm not of Māori and Pacific descent, they are still very inclusive. And I think that had a great impact on my undergraduate experience.” [G-NI-1]

Interestingly, the effect of SPIES in sharing their culture and values through social media had a positive effect on a participant in the study. G-NI-1 described his/her social interactions with SPIES.

“...I'm friends with all these people on social media. And I follow them on whatever social media there is. And the things that they share on there that I can see throughout [undergraduate] and even now play such a big role because that just represents a whole different perspective that I wouldn't have thought of.” [G-NI-1]

This agrees with several studies carried out on the effect of social media on undergraduates. Using social media in the classes, students become more engaged in the subject, participate more in the learning activities and become more collaborative (Junco, Elavsky, & Heiberger, 2013; Heiberger & Harper, 2008). Additionally, higher social capital (life satisfaction, social trust, civic engagement and political participation) is the other benefit of higher Facebook engagement of students. Although the relationship between Facebook use and social capital is not strong, other factors could have influenced the social capital such as life experiences and personality (Valenzuela, Park, & Kee, 2009).

What does the engagement with Māori and Pasifika engineering students contribute to recent graduates in their professional career that requires Māori and Pasifika engagement?

In NZ, the people of NZ should meet their Treaty of Waitangi obligations across all sectors. Hence, NZ engineers should have the skills to engage with Māori, including the Pacific people who have close ties to NZ. Tertiary institutions play a big role in the skill development of undergraduate students to effectively engage with the community (Natarajarathinam, Qiu, & Lu, 2021). Service-learning, community engagement, and teaching and learning activities have been employed by universities to develop the skills of their students (Goldfinch & Kennedy, 2013; Jacoby, 2003). It has been recognised that engineering students should be prepared to engage in communities, particularly the underserved ones (Harsh, et al., 2017). Moreover, the demand from the corporate and industry sectors to develop the ability to work in a diverse group has been increasing and has been studied globally (Sondergaard, Murthi, Abu-Ghaida, Bodewig, & Rutkowski, 2012; Zaharim, Yusoff, Omar, Mohamed, & Muhamad, 2009; Markes, 2006).

In this study, engagement with Māori and Pasifika students academically, culturally and socially has demonstrated a positive effect on non-indigenous students. Similarly, Māori and Pasifika students developed their engagement skills with non-indigenous. The level of engagement of non-indigenous students with Māori and Pasifika students at the university is important. In the teaching and learning activities such as collaborative learning through group projects, non-indigenous students can develop their familiarity to work with Māori and Pasifika students. Numerous studies have demonstrated the benefit of collaborative learning such as enhancement of critical-thinking skills, development or acquisition of communication, design and collaborative skills, and improve student academic performance (Sulaiman & Shahrill, 2015; Terenzini, Cabrera, Colbeck, Parente, & Bjorklund, 2001; Gokhale, 1995). Moreover, collaborative learning activities, when carefully designed and planned, improve the intercultural competence of students (de Hei, Tabacaru, Sjoer, Rippe, & Walenkamp, 2020). However, Māori and Pasifika who attended high school with a culturally diverse student population found engaging with non-indigenous students at the university was only testing the engagement skills already acquired in high school. Similarly, non-indigenous students who attended secondary schools with high percentages of indigenous students can engage with Māori and Pasifika before studying engineering.

Interestingly, socialising and participating in the cultural activities of Māori and Pasifika students tend to have a greater effect on developing the cultural competence of students. Through these activities, non-indigenous students can have an opportunity to establish a good rapport with Māori and Pasifika students. It is important to note that there is a high level of interaction and participation involved. When non-indigenous students are genuinely engaged, Māori and Pasifika students are keen to share their values and culture. Therefore, students who are genuinely engaged with Māori-Pasifika would have sufficient knowledge of their culture and values. They are also prepared to engage with Māori and Pasifika communities when they work as engineers. For example, G-NI-1, who was genuinely engaged with SPIES members and activities, thought that he/she could confidently engage with Māori and Pasifika communities because his/her experience had prepared him/her.

"I feel like because of my experience during my undergrad with my Māori and Pacific peers, I am more aware of how it could be. How it shouldn't be just like ticking a box." [G-NI-1]

Challenges of increasing awareness on Māori and Pasifika culture of engineering students

The Faculty of Engineering has the lowest percentage of Māori (4.9%) and Pasifika (4.4%) students among all the faculties at the University of Auckland (University of Auckland, 2020). The under-representation of Māori and Pasifika students could account for low interaction of non-indigenous students with indigenous students. There is less than a 10% chance that students who belong to non-indigenous students can meet Māori and Pasifika engineering students. The low proportion of indigenous students pursuing science and/or engineering is also observed in other countries (Theodore, et al., 2016).

When engineering students start their specialisations in the second year, the distribution of Māori and Pasifika students varies. Students who belong to mechatronics, software engineering and engineering science specialisations have less probability to have Māori and Pasifika because these three specialisations require the highest minimum GPA as compared to other specialisations (University of Auckland, 2022).

Academically, Māori and Pasifika students tend to be not as successful as Asian and Pakeha ethnic groups. Similar to the findings of Richardson *et al.* (2014), Māori and Pasifika students were underperforming in the engineering field as compared to Pakeha across NZ. On the contrary, Asians dominate the mechatronics, software engineering and engineering science specialisations followed by Pakeha. This may be because the Asian group has the highest population in the Faculty of Engineering. The faculty has many student support programmes available to students such as Part 1 Assistance Centre (available to all Part 1 students) and *Tuākana* (available to Māori and Pasifika students). Their underperformance in their curricular activities may also be due to social factors. U-MP-1 mentioned that he/she is not as confident as non-indigenous students.

"I feel like a big differentiating factor between like Māori and PI students and non-Māori and PI students in a group setting is it is really easy for the non-Māori and PI to dominate the space. I think it's because of the confidence that they have. I feel like we don't seem to have. I know that a lot of my friends feel the same way as well." [U-MP-1]

Māori and Pasifika have low confidence as compared to non-indigenous students. The lack of confidence of Māori and Pasifika in attending tertiary education or passing university entrance has also been found to be detrimental to their success (McKinley & Mahjar, 2014; Gallhofer, Haslam, Kim, & Mariu, 1999). Hence, Māori and Pasifika need more support from the faculty or university to boost their confidence such as organising a meeting with a student academic adviser to check their academic progress during the semester. Moreover, the other possible reason the number of Māori and Pasifika engineering students is low in the top three specialisations could be due to the low uptake of Māori and Pasifika students in the Faculty of Engineering.

Furthermore, this study demonstrates the lack of knowledge of the importance of meeting the Treaty of Waitangi obligations and equity of students by non-indigenous students. Māori and Pasifika participants cited examples of their negative experiences from non-indigenous students:

"...I remember there's this guy in a tutorial group and he was just so ignorant of the iwi requirements like he did not care. He just literally said "Oh, who cares about their needs?" For me, that was a huge shock because I've never experienced that before." [G-MP-1]

"...I was doing my comparison of the Treaty versus Te Tiriti. And honestly like no one even cared...I was trying to discuss this in the tutorial but everyone was just staring at me blankly because maybe it makes them feel uncomfortable." [U-MP-2]

The university must strengthen its commitment to promoting and supporting Māori and Pasifika culture to students. There seems to be more work needed to demonstrate that students have an adequate understanding of the Treaty of Waitangi. Currently, the University of Auckland has *Taumata Teitei* that outlines the vision and strategic plan of the university for the next decade (University of Auckland, 2020a). Additionally, the University of Auckland has demonstrated its commitment to the Treaty of Waitangi based on meeting its objective to develop "partnerships in which the University and Māori work together to achieve their shared aspirations" (University of Auckland, 2020b, p. 3) According to the University of Auckland 2020 annual report, these are met by the following: (i) *Kuptutaka* which makes staff familiar with *Te reo* Māori, (ii) *Te Kūaha*, an app that assists users to learn Māori words and culture, and (iii) the launch of 2020-2025 Māori Language Plan (*Te taonga nō tua whakarere, he tanga mō āpōpō*) to revitalise *Te Reo* at the university premises (University of Auckland, 2020b). These initiatives of the university may have started a while ago now. However, none of the participants mentioned these initiatives. Perhaps, these strategies may need to be continuously promoted to students. Additionally, the unpopularity of these strategies could be due to the Covid-19 lockdown in 2020 and 2021.

Although engineering courses at the University of Auckland have been incorporating Māori and Pasifika cultural knowledge and values into their courses such as ENGGEN 204, ENGGEN 303 and ENGGEN 403, non-indigenous students only comply to meet the requirements but not to genuinely engage with the class activities or projects. Similarly, Māori and Pasifika students lack the interest to interact with non-indigenous students when they feel that non-indigenous students do not genuinely engage with them like as described by G-MP-1.

"I think depending on the situation if they're quite interested and they're receptive like open to hearing what I actually have to say. I would be more open and inclined to [share]. But if they're just stating stuff and there is no genuine engagement, I'd probably be a bit hesitant." [G-MP-1]

The lack of understanding of Māori and Pasifika values such as familial obligations also contributes to a lack of enthusiasm of indigenous students to engage with non-indigenous students as explained by G-MP-1.

“...If I was studying with people who are not Māori and Pacific, I have to pick up my sister from school or my uncle needs me, they would be like “she’s just making excuses.”. They don’t really understand that aspect of life that we have at home. We have a big responsibility to our families and communities.” [G-MP-1]

Moreover, Māori and Pasifika students prefer to work together because they feel more comfortable voicing out their ideas as explained by U-MP-1 and U-MP-2.

“...I also feel like if there were other Māori and PI students in my group, it would be easier to like voice opinions and ideas... to talk about things. Whereas [when working in other group], I feel like you’re quiet. I feel quite silenced.” [U-MP-1]

However, when Māori and Pasifika students feel that non-indigenous students are genuinely engaged, they are enthusiastic to share their culture with them as mentioned by U-MP-1.

“...super interested in the language and I thought that was really interesting because that was the first time we talked about something like that. She was willing to learn and she really wanted to embrace it” [U-MP-1]

The preference to work with a similar ethnic group has been observed in several studies (Volet & Ang, 2012; Summers & Volet, 2008). In the study of Volet and Ang (2012), they identified that cultural-emotional connectedness, language, pragmatism and negative stereotypes are the reasons students prefer to work with a similar ethnic group. All these reasons except language were observed in this study.

Lastly, indigenous and non-indigenous students have different attitudes towards work. Māori and Pasifika students value commitment and relationships. In the study of Houkamau and Sibley (2019), they found that Māori prefer to sustain positive relationships at work instead of individual performance. They attributed this finding to Māori’s attitude towards *whakawhanaungatanga*. Similarly, Pasifika maintain harmonious and respectful *va sites* with their peers because it leads to better student engagement and student success. G-MP-1 cited an example how he/she value positive relationships.

“...if we get A- or B, everyone in our team is happy, we all contributed and no one is dominating with disrespectful attitude, I would happily take a B or B+ or an A- over an A+.” [G-MP-1]

However, this study was not able to further investigate the work attitudes of the different groups as it is not the focus of the research. Hence, the information on the work attitude of Māori and Pasifika was only considered.

Conclusions

This study demonstrates that Māori and Pasifika can have a positive impact on non-indigenous engineering students and contribute to the development of the skills necessary for their profession. It has been identified that there are many possible ways to increase awareness of engineering students about Māori and Pasifika culture namely, (i) teaching and learning activities, (ii) university-wide student support programmes, and (iii) Māori and Pasifika student-led initiatives. However, there are challenges and barriers in the student interaction and engagement between the Māori and Pasifika and non-indigenous students, such as the under-representation of Māori and Pasifika students in the Faculty of Engineering. Additionally, the lack of understanding of meeting the Treaty of Waitangi responsibilities, the negative experiences of Māori and Pasifika students, and the differences in culture and values need to be addressed. In this way, both indigenous and non-indigenous students would be more engaged and become culturally competent. When non-indigenous students are genuinely engaged with Māori and Pasifika students, they have a better understanding of the indigenous culture, values and practices. This can potentially be an asset to students when their profession requires Māori and/or Pasifika engagement.

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References

Bennett, M. J. (2009). Defining, measuring, and facilitating intercultural learning: a conceptual introduction to the Intercultural Education double supplement. *Intercultural Education*, 20(sup1), S1-S3.

- Bishop, R. (1999). Kaupapa Maori Research: An indigenous approach to creating knowledge. In N. Robertson (Ed.), *Maori and psychology: Research and practice* (pp. 1-7). Hamilton: Maori & Psychology Research Unit.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101.
- Chang, M. J. (2002). The impact of an undergraduate diversity course requirement on students' racial views and attitudes. *The Journal of General Education*, 21-42.
- de Hei, M., Tabacaru, C., Sjoer, E., Rippe, R., & Walenkamp, J. (2020). Developing intercultural competence through collaborative learning in international higher education. *Journal of Studies in International Education*, 24(2), 190-211.
- De Sisto, M., Huq, A., & Dickinson, G. (2021). Sense of belonging in second-year undergraduate students: the value of extracurricular activities. *Higher Education Research & Development*, 1-16.
- Dinges, N. G., & Baldwin, K. D. (1996). Intercultural competence: A research perspective. In D. Landis, J. M. Bennett, & M. J. Bennett (Eds.), *Handbook of Intercultural Training* (3rd ed., pp. 106-123). California: Sage Publications, Inc.
- Gallhofer, S., Haslam, J., Kim, S. N., & Mariu, S. (1999). Attracting and retaining Maori students in accounting: Issues, experiences and ways forward. *Critical Perspectives on Accounting*, 6, 773-807.
- Gokhale, A. A. (1995). Collaborative learning enhances critical thinking. *Journal of Technology Education*, 7(1), 22-30.
- Goldfinch, T., & Kennedy, J. (2013). Understanding indigenous consultation and engagement in engineering education. *Australasian Association for Engineering Education*, 1-10.
- Gregersen-Hermans, J. (2017). Intercultural competence development in higher education. In Intercultural competence in higher education. In D. K. Deardorff, & L. A. Arasaratnam-Smith, *Intercultural Competence in Higher Education* (pp. 67-82). London, UK: Routledge.
- Harsh, M., Bernstein, M. J., Wetmore, J., Cozzens, S., Woodson, T., & Castillo, R. (2017). Preparing engineers for the challenges of community engagement. *European Journal of Engineering Education*, 42(6), 1154-1173.
- Heiberger, G., & Harper, R. (2008). Have you Facebooked Astin lately? Using technology to increase student involvement. *New Directions for Student Services*(124), 19-35.
- Houkamau, C. A., & Sibley, C. G. (2019). The role of culture and identity for economic values: a quantitative study of Māori attitudes. *Journal of the Royal Society of New Zealand*, 49(sup1), 118-136.
- Hurtado, S., & Carter, D. F. (1997). Effects of college transition and perceptions of the campus racial climate on Latino college students' sense of belonging. *Sociology of Education*, 70(4), 324-345.
- Jacoby, B. (2003). *Building Partnerships for Service Learning*. San Francisco, CA: John Wiley & Sons Inc.
- Junco, R., Elavsky, C., & Heiberger, G. (2013). Putting twitter to the test: Assessing outcomes for student collaboration, engagement and success. *British Journal of Educational Technology*, 44(2), 273-287.
- Marin, P. (2000). The educational possibility of multi-racial/multi-ethnic college classrooms. In J. R. Alger, J. Chapa, R. Gudeman, P. Marin, G. Maruyama, J. F. Milem, . . . D. J. Wilds, *Does Diversity Make a Difference* (pp. 61-83). Washington DC: American Association of University Professors.
- Markes, I. (2006). A review of literature on employability skill needs in engineering. *European Journal of Engineering Education*, 31(6), 637-650.
- McKinley, E., & Mahjar, I. (2014). From schools in low-income communities to university: Challenges of transition for Maori and Pacific students. In F. Cram, H. Phillips, P. Sauni, & C. Tuagalu (Eds.), *Māori and Pasifika Higher Education Horizons* (Vol. 15, pp. 241-252). Bingley, UK: Emerald Group Publishing Limited.
- Natarajarathinam, M., Qiu, S., & Lu, W. (2021). Community engagement in engineering education: A systematic literature review. *Journal of Engineering Education*, 110, 1049-1077.
- Ponterotto, J. G. (2002). Qualitative research methods: The fifth force in psychology. *The Counseling Psychologist*, 30(3), 394-406.
- Prebble, T., Hargraves, H., Leach, L., Naidoo, K., Suddaby, G., & Zepke, N. (2004). *Impact of Student Support Services and Academic Development Programmes on Student Outcomes in Undergraduate Tertiary Study: A Synthesis of the Research*. Wellington: Ministry of Education, New Zealand.
- Richardson, K., Tarr, A., Miller, S., Sibanda, N., Richardson, L., Mikaere, K., . . . Wei, V. (2014). Āwhina reloaded: Updated results from a programme for Māori and Pacific tertiary graduate and postgraduate success in science, engineering, and architecture and design. In F. Cram, H. Phillips, P. Sauni, & C. Tuagalu (Eds.), *Maori and Pasifika Higher Education Horizons* (Vol. 15, pp. 179-200). Bingley, UK: Emerald Group Publishing Limited.
- Sondergaard, L., Murthi, M., Abu-Ghaida, D., Bodewig, C., & Rutkowski, J. (2012). Managing for results in the tertiary education sector. In *Skills, Not Just Diplomas: Managing Education for Results in Eastern Europe and Central Asia* (pp. 139-164). Washington, DC: The World Bank.

- Soria, K., Lingren Clark, B., & Coffin Koch, L. (2013). Investigating the academic and social benefits of extended new student orientations for first-year students. *The Journal of College Orientation and Transition*, 20(2), 33-45.
- SPIES. (2020). *South Pacific Indigenous Engineering Students*. Retrieved from <https://www.spiesuoa.co.nz/>
- Sulaiman, N. D., & Shahrill, M. (2015). Engaging collaborative learning to develop students skills of the 21st century. *Mediterranean Journal of Social Sciences*, 6(4), 544-552.
- Summers, M., & Volet, S. (2008). Students' attitudes towards culturally mixed groups on international campuses: impact of participation in diverse and non-diverse groups. *Studies in Higher Education*, 33(4), 357-370.
- Terenzini, P. T., Cabrera, A. F., Colbeck, C. L., Parente, J. M., & Bjorklund, S. A. (2001). Collaborative Learning vs. Lecture/Discussion: Students' Reported Learning Gains. *Journal of Engineering Education*, 90(1), 123-130.
- Theodore, R., Tustin, K., Kiro, C., Gollop, M., Taumoepeau, M., Taylor, N., . . . Poulton, R. (2016). Māori university graduates: indigenous participation in higher education. *Higher Education Research & Development*, 35(3), 604-618.
- Umbach, P. D. (2006). Student experiences with diversity at liberal arts colleges: Another claim for distinctiveness. *The Journal of Higher Education*, 77(1), 169-192.
- University of Auckland. (2012). *Strategic Plan 2013–2020*. Retrieved from <https://cdn.auckland.ac.nz/assets/auckland/about-us/the-university/official-publications/strategic-plan/strategic-plan-2013-2020-web-version.pdf>
- University of Auckland. (2020a). *Taumata Teitei: Vision 2030 and Strategic Plan 2025*. Retrieved from <https://cdn.auckland.ac.nz/assets/auckland/about-us/the-university/official-publications/strategic-plan/2021-2030/taumata-teitei-vision-2030-and-strategic-plan-2025.pdf>
- University of Auckland. (2020b). *Annual Report 2020: Resilience during a pandemic*. Retrieved from <https://cdn.auckland.ac.nz/assets/auckland/about-us/the-university/official-publications/annual-report/2020-Annual-Report-UoA-final.pdf>
- University of Auckland. (2021a). *Our Graduate Profiles*. Retrieved from <https://www.auckland.ac.nz/en/engineering/study-with-us/career-pathways/graduate-profile.html>
- University of Auckland. (2021b). *Course Outlines*. Retrieved from <https://courseoutline.auckland.ac.nz/dco/course/>
- University of Auckland. (2021c). *UniGuide Programme*. Retrieved from <https://www.graduatemap.auckland.ac.nz/en/for/current-students/cs-student-support-and-services/cs-academic-and-learning-support/cs-uniguide.html>
- University of Auckland. (2022). *Choosing your Engineering specialisation*. Retrieved from <https://www.auckland.ac.nz/en/engineering/current-students/undergraduate/choosing-engineering-specialisation.html>
- Vaiioleti, T. M. (2006). Talanoa research methodology: A developing position on Pacific research. *Waikato Journal of Education*, 12, 21-34.
- Valenzuela, S., Park, N., & Kee, K. F. (2009). Is there social capital in a social network site?: Facebook use and college students' life satisfaction, trust, and participation. *Journal of Computer-Mediated Communication*, 14, 875-901.
- van Gijn-Grosvenor, E. L., & Huisman, P. (2020). A sense of belonging among Australian university students. *Higher Education Research & Development*, 39(2), 376-389.
- Volet, S. E., & Ang, G. (2012). Culturally mixed groups on international campuses: an opportunity for inter-cultural learning. *Higher Education Research & Development*, 31(1), 21-37.
- Ward, C. (2001). *The impact of international students on domestic students and host institutions*. Wellington City, New Zealand: Education Counts. Retrieved from https://www.educationcounts.govt.nz/publications/international/the_impact_of_international_students_on_domestic_students_and_host_institutions
- Zaharim, A., Yusoff, Y. M., Omar, M. Z., Mohamed, A., & Muhamad, N. (2009). Engineering employability skills required by employers in Asia. *Proceedings of the 6th WSEAS International Conference on Engineering Education*. 1, pp. 195-201. Wisconsin, US: World Scientific and Engineering Academy and Society.