

Architecture as a Tool for Inclusion and Community Building

Women in Fabrication at Zayed College for Girls

Priscila Besen, Dr Yusef Patel, Alice Couchman and Peter McPherson

Abstract

Women in Fabrication is a collaborative platform that empowers female high-school students, architecture students and young architects through design and construction. The project partnered with Zayed College for Girls to improve its built environment and interface with the community, by constructing a pavilion near the school entrance where students can wait for their parents after school. To ensure the users of the space had an active voice in the project, workshops were held at the college, where students learnt about basic principles of design and technology, provided input on the most suitable location for the pavilion and developed concept designs for this structure. They were mentored by female architecture students and young architects, as well as their everyday teachers. The design process celebrated the rich cultural diversity that is part of this community, including the application of Te Aranga Māori Design Principles, which honour New Zealand's indigenous culture, as well as the integration of Islamic traditions that are an integral part

of the school's philosophy. The discussions, concepts and ideas from the workshops informed the final design of the pavilion. The design was then refined by a group of female architecture students and professionals, and constructed by them using digital fabrication technology to maximise efficiency and minimise waste of resources. Both stages of the project aimed to strengthen teamwork and leadership skills for women architects and students, and to celebrate diversity and inclusion in the design process.

Introduction

The number of women graduating from architecture programmes in New Zealand has been increasing over the last decades, reaching parity with men in 2018.¹ However, the proportion of women practising in the profession and becoming registered architects does not reflect these statistics. Although the architectural industry has come a long way in both professional and academic spheres, numbers show more work needs to be done with the

1. Errol Haarhoff, Paola Boarin, and Natalie Allen, *Architecture Graduate Progression to Practice in New Zealand: 1987-2018*, Research Report, School of Architecture and Planning (Auckland: The University of Auckland, 2020).

2. Eleanor Wenman, "No Easy Fix to New Zealand's Shortage in Tradespeople and Builders," *Stuff*, July 6, 2016, <https://www.stuff.co.nz/business/103492215/no-easy-fix-to-the-shortage-in-tradies-and-builders>.

uptake of female leadership and promotion within the architectural, engineering and construction professions.²

To address this, initiatives such as Architecture + Women NZ³ and the National Association of Women in Construction⁴ have developed valuable projects to promote and encourage women to further their careers in the profession. To further advance this agenda, academics and students at Unitec New Zealand's School of Architecture created the Women in Fabrication initiative to provide career development opportunities to women in Auckland's architecture schools. The initiative provides a platform for female students to develop, design and fabricate an industry- or community-sponsored project. The students who participate are provided with mentorship opportunities from female leaders within the construction and architectural industries.⁵

The first project undertaken was in collaboration with PrefabNZ to create the *Living and Interactive Pods* exhibition for the 2017 Build NZ | Designex expo. The same exhibit was re-envisioned for the 2017 Festival of Architecture exhibition and as 'living pods' seating for *NZ Life and Leisure* magazine's "In Your Backyard" edition. The Women in Fabrication 2.0 project was produced over the summer of 2018 and 2019 in collaboration with Futurebuild LVL to investigate the recycling of laminated veneer lumber (LVL) into an impressive product stand for the 2019 New Zealand Institute of Architects Insitu Auckland conference and the 2019 Architectural Designers New Zealand Queenstown conference.

The initiative is now in its third edition, and this article reports on the experience and learning outcomes from Women in Fabrication 3.0. The programme was developed as a collaboration between lecturers, postgraduate students and undergraduate students from Unitec and The University of Auckland, as well as architectural designers and graduates. The aim of the project was to collaborate with Zayed College for Girls to improve the school's built environment by constructing a seating pavilion near the main school entrance. Zayed College for Girls is a decile 3, state-integrated, special character Islamic secondary school for girls Year 7 to 13, located in Māngere, Auckland.

Architecture students, graduates and lecturers hosted design classes and workshops at the school, to ensure students had an active voice in the project. The high-school students learnt about basic architectural design principles, digital technology, urban design and engineering concepts. The design process celebrated the rich cultural diversity that is part of the community, including the integration of Islamic traditions that are an integral part of the school's philosophy, as well as the application of Te Aranga Māori Design Principles,⁶ which honour New Zealand's indigenous culture. The discussions and concepts from the classes informed the final design of the pavilion, which was built at Unitec's School of Architecture workshops. The final product was due to be exhibited at the 2020 Build NZ expo at the ASB Showgrounds before being permanently located at Zayed College for Girls. Due to the Auckland's August 2020 Covid-19 restrictions, the installation of the pavilion was delayed.

Objectives of Women in Fabrication 3.0

The main objective of this initiative is to provide a holistic approach to addressing the underrepresentation of women architects in New Zealand by critically questioning not only how design is translated into the built environment but by whom. Although there has been a lot of positive work to represent women within the architectural industry, there are still many gaps to fill. Women in Fabrication seeks to further educate both students and practitioners to acquire new expertise in the realm of emerging digital technologies, fabrication logic, making skills and female leadership. The aims of Women in Fabrication 3.0 are:

1. To facilitate and represent female role models within the architecture industry to interested young female high-school students.
2. To educate and empower undergraduate and post-graduate architecture students.
3. To provide an architectural output in support of female Islamic students following the Christchurch terror attacks.

3. Architecture + Women NZ, <https://www.architecturewomen.org.nz/>.

4. National Association of Women in Construction, <https://www.nawic.org.nz/>.

5. Alice Couchman, Yusef Patel, and Peter McPherson, "Women in Fabrication: A Platform for Inclusive and Diverse Design," in *Meeting the Challenges of Higher Density: 52nd International Conference of the Architectural Science Association*, edited by P. Rajagopalan, 453–60 (The Architectural Science Association, 2018).

6. Auckland Design Manual, "Te Aranga Principles," <http://www.aucklanddesignmanual.co.nz/design-subjects/maori-design>.



Figure 1. Workshop at Zayed College for Girls. Photograph: Joelle Tolentino

Approach to Working with High-school and Architecture Students

The project was divided into three stages. The first stage saw a variety of architecture students and practitioners with different backgrounds and expertise host classes and workshops at Zayed College for Girls. The classes were themed, and ranged from teaching students how to design within the urban environment, create 3D models in SketchUp, sketch concept design drawings, make cardboard models to express their ideas and explore Te Aranga Māori Design Principles. The second stage asked architecture students to refine the design concepts that Zayed College students had come up with to form a tangible architectural product. A large amount of work was required to engineer the high-school students' concepts into a single design. The third stage required architecture students to adapt the final design into a flat plywood product that could be manufactured by CNC router. Once the flat-pack plywood kit components were made, the design was tested at the architecture workshops before being sent to site for final assembly.

Community Engagement and Sustainability

Community participation was developed by working with the Zayed College for Girls Principal, Regina Rasheed, to develop a programme that best catered for the needs and values of the school. While the college provided support and facilities for the design course to take place, Unitec provided funding, materials and equipment for the project. Building industry stakeholders, such as Resene and Carter Holt Harvey Plywood will also partner with the project for the fabrication of the pavilion, sponsoring materials for the construction.

The project addresses two United Nations Sustainable Development Goals (SDGs): Goal 5, Gender Equality, and Goal 11, Sustainable Cities and Communities. Within these goals, Target 5.5, "Ensure full participation in leadership and decision making," and Target 5 B, "Promote empowerment of women through technology," were considered and implemented.⁷ The project is led by women, female students had an active voice in the design, and the fabrication stage will again empower women in architecture and construction. Target 11.7, "Provide access

7. United Nations, *Transforming Our World: The 2030 Agenda for Sustainable Development* (New York: United Nations, 2015), <https://www.un.org/sustainabledevelopment/development-agenda/>.



Figure 2. Workshops at Zayed College for Girls – physical model-making. Photographs: Priscila Besen

to safe and inclusive green and public spaces,” was also considered.⁸ Once built, the proposed shelter will provide a safe place for students and a better interface with the school and its neighbourhood context. The Women in Fabrication 3.0 project was part of the international initiative Local Project Challenge, which aims to increase awareness of the SDGs and the New Urban Agenda. The project was exhibited alongside other local initiatives from 39 different countries in an online gallery.⁹

Project Findings and Reflections

The process of working with the community promoted diversity and enriched the design process, especially since this is the only Islamic girls’ school in Auckland. After the Christchurch attacks in March 2019, a motivation to find ways to represent Muslim women in New Zealand became a driving force in the perception of Islamic culture in New Zealand’s public places. This project highlighted acceptance and diversity within New Zealand, by bringing together people from many cultures and backgrounds to work together, collaborate and learn from each other. Unitec



students and graduates showed their willingness to celebrate diversity by working with the community to develop and produce a shelter that represents both the Islamic culture and the New Zealand architectural landscape.

The initiative provided for two types of learning activities to take place:

1. Teaching students from Zayed College about architecture, materials, technology and innovation;
2. Allowing students at Unitec to develop their design, leadership and digital fabrication skills.

8. United Nations, *Transforming Our World*.

9. “Women in Fabrication: Zayed College for Girls,” Local Project Challenge, 2019, <https://localprojectchallenge.org/women-in-fabrication-making-a-pavilion-for-zayed-college-for-girls/>.



Figure 3. Fabrication of the pavilion at Unitec.
Photographs: Yusef Patel

Understanding the audience is important. High-school students are different to normal architecture students and need a variety of stimuli to engage with the design process. The high-school teachers and the lecturers found:

1. From a student's point of view we need to ensure there is enough interaction; to get them interested, lots of fun activities were required. A feedback form was given to students in the final workshop, which highlighted that the most interactive activities were more successful in providing learning outcomes, when compared to slide presentations.
2. The high-school students' imagination and naivety around architecture, design and construction can really





Figure 4. Architecture students assembling the pavilion.

Photographs:
Yusef Patel

help generate ideas that professionals and university students cannot come up with.

3. Model making and being creative is fun, especially for the practitioners involved with the project, who often forget about this side of architecture.
4. There is not enough collaboration between university level and high-school level. There are a lot of disconnects, and this project can help to bridge this gap. The project also enabled both the high-school students and the architecture students to develop team working skills. High-school students found that designing is difficult; they found it is even more challenging to design in groups. Interestingly, the facilitation of group work is as relevant and essential in high schools as it is in tertiary education. The importance of working in groups collaboratively is an essential skill in the workplace outside of education. Zayed College teachers highlighted that there are simply not enough opportunities to teach students how to collaborate with one another in high school. The same view could be said to be true within architecture schools, and this project showed that collaborative design work can help achieve much better results than individual practice. The diversity between the people involved in the project – different ages, education levels, cultures and backgrounds – enriched the design process and helped to create a better outcome.

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Peter McPherson is a Senior Lecturer and Head of the School of Architecture at Unitec New Zealand, and is a practising architect. He is interested in research-led design practice, particularly in design theory, and research into architectural geometry and its application to architecture and urban design. His research interests include architectural education;

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