



# **Building A Better New Zealand Conference 2014**

## **Waste Not, Want Not: Education for Sustainability in the Construction Industry**

**Presenter:**

**Daniel Fuemana**

Head of Department

Building Technology

**Wednesday 3 September 2014**

*(Rendezvous Grand Hotel Auckland)*



# Introduction

*“Not teaching but transforming”* – an educational process which is easy to espouse but frequently hard to achieve in practice.

This case study, shows that by immersing students in the practicalities of construction waste management, they can cross a threshold of understanding of the wider principles of sustainability (Timmermans, 2009).

By persuading degree students to climb into construction waste bins, analyse the contents and investigate re- or up-cycling for all of the products, they became able to appreciate the role that waste reduction.



# United Nations (UN) Expectations

The United Nations (2002) defines education for sustainability

To achieve this goal of educating global communities, 2005 to 2015 was declared as the ***Decade of Education for Sustainable Development*** (Parliamentary Commissioner for the Environment, 2004).

During this decade the UN expects countries to embed education for sustainability in all educational



**To achieve global sustainability that the UN envisages**, it is essential that educators move away from *transmissive forms of learning* to *transformative learning*.

**Transmissive** relies on one-way flow from teacher to learner.

**Transformation** focus on experiential learning, active learning and critical thinking.



## **Skill demand and skill shortage**

Auckland house shortage (32, 000 within the next two years)  
average 6-7000 build per year.

Auckland Unitary plan estimate 400,000 houses needed by 2040

Leaky buildings estimate in 2008 to be around \$11.3 billion dollars reported by Price Waterhouse Cooper to the Government. Other experts estimate the true cost \$23 billion dollars.

Christchurch rebuild required 30,000 skilled tradespeople additional to the normal working population.

Earthquake strengthen buildings, an estimate of 15000-25000 earthquake prone buildings nationally. *Maurice Williams 2013*



# Auckland Construction and Infrastructure Landscape

## **Employment growth in the Auckland C&I sector**

Auckland has the largest share of forecast levels of growth for the C&I in NZ. Auckland's construction sector is predicted to grow from 8.2 billion dollars in 2013/2014 to 11.8 billion dollars in 2018/19 and 12.2 billion by 2023 (48% higher than 2013/14).

The workforce in the Auckland construction sector is anticipated to increase at an annual rate of 4.8% per year between 2013-2018, higher than national growth forecasts for employment in this sector.

It is therefore essential that the future students join the profession with a deep awareness of the importance of sustainability already embedded as part of their psyche.



# Methodology of the Case Study

## **Student profile**

**Compulsory paper** which focus on global sustainability

**Course aims** enable students to:

- Investigate
- integrate this knowledge
- participate in a waste management project
- teams examine the construction.



## Methodology of the Case Study ... cont.

- *investigate the various categories of waste they identified and investigate options available to re- or up-cycling for all of the products*
- participate in a questionnaire that was designed to discover to what, if any, extent their understanding of waste management had been transformed by this process.
- this *process in turn* would *encourage transformational thinking*. Their critical analysis via the online forum, in conjunction with the results of the questionnaire.

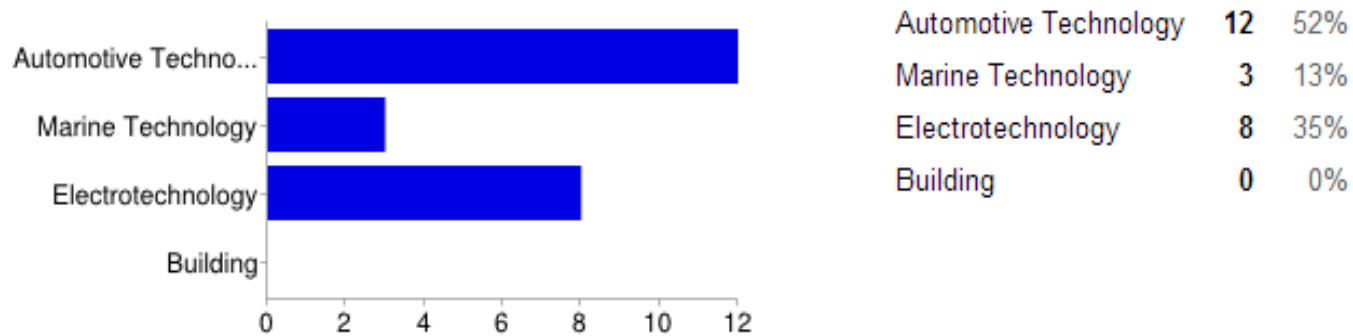




# Data Analysis and Discussion

23/60 students participated in the survey generating a 34% response rate.

Table 1: Disciplines of those responding to questionnaire



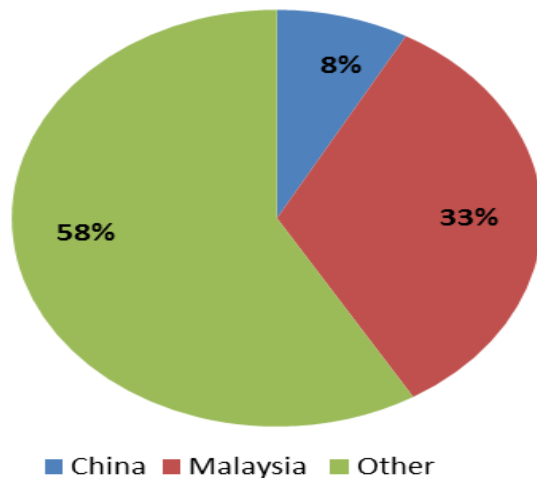
The depth of reflection and critique varied amongst the different groups. Some groups were very focused and others superficial



# Data Analysis and Discussion ... cont.

Out of the students who responded to the questionnaire, approximately half were international, the majority of whom were due to return to their home countries when qualified.

Table 2: Home countries of international participants





Four main themes emerged from the questionnaire evaluation and their responses were examined in parallel with the forum responses made by the different groups after their exposure to the waste. These were:

1. Real World Waste
2. Waste management in industry
3. Money matters
4. Students' perceptions of the activity's value



## 1. Real World Waste

*(first point for transformation of values and attitudes)*

... students appreciated the project

*“it helped me see what sort of waste is created in the area we are in and if we don’t see it than we can’t imagine it”.*

... gave them an insight into the real waste generated

... experience first hand

*“it is good to get out of the classroom and see and touch what we are learning about”.*

... identified simple issues ignored by industry



## Findings

- ... disappointment seeing waste not properly grouped  
*“waste material sorting method wasn’t appropriate or correctly sorted” and “people did not classify waste material very well”*
- ... students starting to critically evaluate waste recycling  
*“students are mixing all the waste together which is very hazards’[sic] because most of the waste are flammable and easy to catch the fire. Moreover the containers are uncovered and not made for collect most of the waste. In addition the safety topics are not covered in this area.”*
- ... saw the importance of planning to reduce waste  
*“planning ahead of project saves material wastage*
- ... educating the community to be aware of recycle  
*“educating people”*



## **2. Waste Management in Industry** *(critically thinking)*

Students considered waste to be extremely important issues for their respective industry and were able to relate waste with their own discipline.

*“we need waste management information for e.g. oil can’t be recycled and can’t throw away in public places” and “as there are many electrical wastes getting into the environment everyday making technology more sustainable is crucial in today’s world.”*

This seemingly simple observation indicates that students are now thinking about the full life cycle picture of sustainability and not solely focusing on waste recycling.



### **3. Money Matters**

*(realisation)*

Many students had realised that waste management was not an overall expense to industry but was an area where significant financial savings could be returned to companies.

*“waste management could save some money”* and another stated that, *“when I am qualified I will set up waste management so I can save more money in my business.”*

### **4. Student’s Perception of the Activity’s value**

*(awareness)*

Students confirmed that the activity had heightened their awareness of waste management



## Conclusion

By persuading our degree students to climb into construction waste bins, analyse the contents and investigate re- or up-cycling for all of the products, they become able to appreciate the role that waste reduction can play at each stage of a product's life cycle, from sensitive design to careful deconstruction.

The questions posed at the start of this study were: *was the waste investigation project worth doing and would it allow transformational learning to occur?* While the students' responses to the first is an unequivocal 'Yes', it is more difficult to guarantee the latter. However, it does appear that it has allowed students to move towards a greater awareness of their engagement with the issue.