Work in Progress - A Master of Design Program Collaborating with Electronic Engineering and Technology

Tom Ziming Qi
Unitec Institute of Technology, Auckland, New Zealand
tqi@unitec.ac.nz

Abstract – Like most postgraduate programs at design, the Master of Design in Unitec New Zealand is a multi-disciplinary programme that gives students the opportunity to sharpen their skills in collaboration with other design professionals. The degree is 'by project', which means that the student undertake a project based on an aspect of their design practice to date. There is no coursework, although the design project will be supported by a strong contemporary theoretical framework, which teaches students to design products in support of human activities and interactions. Normally, such an academic program intends to produce so called Industrial Designers, who are a cross between an engineer and an artist. The students study both function and form, and the connection between product and the user. Therefore, they do not need to design e.g. the circuits that control a motor. Since Electronic engineering and technology has been introduced to this program, questions have been asked: Is a student’s scientific research background useful in designing? This paper analyses three Master of Design students’ projects as examples to discover an innovative uses of Master of Design for Electronic engineering and technology graduates to acquire what industries needed.

Index Terms - design methods, engineering and technology education, Industrial Design, postgraduate degree

INTRODUCTION

There is a discussion on an understanding between the overlapping functions in industrial design and design engineering [1] in many years: One opinion is that industrial designer and design engineer are two individual posts wilest other opinion prefers a hybrid of industrial designer and design engineer. In fact, most of industries employ both of industrial designer and design engineer for their product developments and many universities have offered such undergraduate degrees.

I. Bachelor degree program in design

Unitec New Zealand offers Bachelor of Product Design[2], which covers Applied Creativity and Teamwork, Ergonomics, Design History and Context, Computer Aided Design, Design in Aotearoa/New Zealand and the Pacific, Human Factors. Such an undergraduate degree is very popular in many universities e.g. Swinburne University of Technology in Australia[3]. Unfortunately there are no engineering or technology courses in this degree.

In order to product graduate equipped with both Industrial design skill and engineering skill, some universities such as Swinburne University of Technology has Bachelor in Product Design engineering[4] which is a combination of two traditionally separate fields each with its own strength: engineering with its scientific material and manufacturing knowledge and industrial design with its human-centered approach. These two disciplines have been brought together to produce a new graduate who will develop competitive products in both quality and design. The subjects studied during the course are equally shared by the Faculty of Engineering and Industrial Sciences and the Faculty of Design. These subjects have a focus on creative design, engineering science, material and manufacturing process selection, project management and innovation.

Some universities offer double major degree e.g. Monash University in Australia[5] has Bachelor of Engineering and Bachelor of Design (Industrial Design).

Comparing with a traditional engineering degree, either a combined degree with engineering and industrial design or a double major degree in engineering and industrial design does not deepen students' engineering background.

II. Bachelor of Engineering Program

As an example, in Auckland University in New Zealand, Bachelor of Electrical and Electronic Engineering (EEE) [6] is an four year program, which is accredited by Institute of professional Engineer New Zealand (IPENZ). IPENZ is a founding signatory to the Washington Accord, which was signed in 1988. This agreement ensures that all engineering degrees accredited by any of the signatories are recognized as being substantially equivalent by all of the signatories. The other jurisdictions that are signatories to the Washington Accord are Australia, Canada, Chinese-Taipei, Hong Kong-China, Ireland, Japan, Korea, Singapore, South Africa, United Kingdom and USA. A set of rules and procedures underpins the operation of The Washington Accord. Individual accord signatories give credit for IPENZ accredited degrees gained prior to 1988 at their own discretion [7]. This degree is covering: Power Systems; Power Electronics;
Communications; Radio Systems; Digital Signal processing and Computer Systems. This degree provides a broad foundation of basic science, engineering science, electrical engineering, and selected fields of current technology, which the professional engineer can build on throughout his or her career. The program is including electrical materials and electronic devices; circuit theory; software design; and mathematical modeling tools. An introduction to engineering electromagnetics and computer systems is also provided, and the course’s present-day relevance is strengthened by investigating how engineering fits into the wider context of human social and cultural development. In the second semester students take part in practical design exercises. The program has also been exposed to all modern Electrical and Electronic Engineering concepts in the final year. In elective courses, a selection of subjects allows students to go with their preferences and skills. A final-year project is due, which has the weighting of more than 25% of the year’s work and represents the culmination of the Engineering design strand.

This traditional engineering degree goes toward to produce a professional engineer and not an industrial designer although its graduates have knowledge on the wider context of human social and cultural development.

III. Master of Design Program

Unitec Master of Design [8] The degree is 'by project', which means that students undertake a project based on an aspect of their design practice to date. There is no coursework, although the design project will be supported by a strong contemporary theoretical framework. Each year, the students take part in several design workshops, at which you present your work in progress for critique and evaluation by invited international designers, architects and landscape architects. Guests are chosen for their innovative approach to design and come from a diverse range of countries and professional backgrounds; recent guests have been experts in sustainable product design, museum design and curation, and graphic design.

CASE STUDY IN MASTER OF DESIGN STUDY

I. A Master of Design Project 1

Halfon [9] presented a project design as “Lamp Some” which was developed to its final shape and consisted of coaster-dimmer control, a lamp and a table-mat. The lamp is positioned on the dining table to create an intimate atmosphere (e.g. romantic set-up). Operating the light output is done by turning an object placed on the coaster (i.e. wine bottle, tea pot, wine glass), de-centres the traditional activation of a lamp by using a domestic object to activate the light. The short distance between the table lamp and the coaster helps the user to observe the simultaneous cause-and-effect relationship between manipulating the coaster-dimmer and the changing light. This design preformed as a good concept but did not produce an up-to-date technical solution to the design because this student was leak of engineering background. If this student has electronic engineering background, he could be able to apply suitable sensing technology e.g. Infrared sensor, sound sensor and graph sensor to get data acquisition. Finally a Digital Signal Processing (DSP) could be employed to design a cause-and-effect relationship.

II. A Master of Design Project 2

Acanski [10] is completing of his project, which is to introduce a unique valve sound to the new generation of customers using contemporary visual language in order overcome the current mismatch between today’s market/customer’s design and a piece of legacy equipment. The research of this project has been extended from 18 months to 3 years because the project researcher (a master of Design student) had been studying to achieve engineering knowledge and skill e.g. Printed Circuit Board design and Microcontroller programming, to complete the prototype to examine and identify the design target and the desired result.

III. A Master of Design Project 3

Liang [11] is currently designing a regeneration system to capture the energy from braking a car then transfer the energy into a mechanical energy storage and then the storage can provide additional power on the electric motor when the energy is needed e.g. run uphill. This student came with engineering background (She was a full-time Mechanical Engineer when she enrolled to the program). Once she start this program, this student had been fitting well in the project design under supervision at area of Applied Creativity and Teamwork, Ergonomics, Design History and Context, Computer Aided Design, and Human Factors.

CONCLUSION AND DISCUSSION

In conclusion of the analysis three Master of Design students’ projects, a student, who has engineering background, has advantage in Industrial Design. The further research will be continuing on data collection and analysis at more students’ project.

REFERENCES