

# GET READY: INCLUSIVE CURRICULUM IN INDUSTRIAL DESIGN

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## ABSTRACT

The recent experience of Industrial Design staff in addressing the needs of a student with a physical disability raised awareness among academic staff of the need to accept responsibility for developing an inclusive curriculum. A case study that illustrates the challenges faced by academics when encountering this situation for the first time indicates that effective implementation of an inclusive curriculum requires substantial consideration, time, planning and resources. One aspect of the paper's contribution to the field of Design Education is in highlighting the need for further research into development of an inclusive curriculum in discipline areas that involve high levels of manual dexterity.

*Keywords: Inclusive curriculum, Design Studio, Case study*

## 1 INTRODUCTION

This paper examines challenges faced by academics in enabling greater participation of students with physical disabilities in disciplines using teaching methods which traditionally require a high level of physical activity such as Industrial Design and Design Studio. The paper highlights the need for the development and improvement of inclusive curricula in the Industrial Design Degree offered by the University of Western Sydney (UWS). Generally, the 'hands on' approach of design studio teaching coupled with little or no development of curricula to address barriers that prevent inclusion of students with disabilities have discouraged participation of students with a physical disability.

The need for UWS to address the above issue is made clear when considering the case of the student outlined in this paper. This student's particular history highlights the lack of preparedness of the discipline lecturers in their approach to incorporating students with physical disabilities in their classes. It also highlights the need for UWS to address the curricula and learning approaches that have traditionally excluded such students from participating in discipline areas that require high levels of 'hands on' engagement. This lack of preparedness is more evident in subjects with practical components such as drawing and model making which require manual dexterity.

It is acknowledged that the 'hands on' nature of the Industrial Design discipline will remain and it is not the purpose of this paper to attempt to challenge this aspect. The principal aim is to highlight, through the use of a case study, where the curriculum

coupled with teaching methodologies, impedes the participation of potential students because of their disability. This in turn prevents these students from participating in the profession.

## **2 BACKGROUND**

In many cases, academic staff have been notified only days before the beginning of semester that they may be teaching a student with a disability, with the worse case scenario being an academic who encounters the student on the day they arrive for their first lecture, tutorial or workshop.

A situation where a student is unable to perform the tasks or achieve the skills as 'planned' by the lecturer could lead to frustration for both parties. For example, the lecturer could recognise the prescribed tasks that need to be redesigned for the individual student but may not have the skills or know-how to implement them. As well, the student could recognise that they are unable to achieve the outcomes that are expected of them. It is the lag in implementing appropriate strategies that compounds the frustration, and students could become disenfranchised early in the semester if they feel neglected or if they experience the institution's lack of foresight or preparation.

This situation could be considered a hindrance; however it can also pose an interesting challenge for programs that place assumptions on students' levels of manual dexterity and, if addressed well, prove very rewarding. For educators, it could challenge traditional notions of how subject objectives are devised, how skills are measured and how outcomes are gauged. In addition, students could be challenged in their perceptions about their own abilities.

### **2.1 Case Study**

Anne, who had significant physical disabilities with very limited fine motor skills and relied on an electric wheelchair for mobility, enrolled in an Industrial Design degree. Prior to the commencement of semester she advised the UWS Disability Office of her situation, however, this information did not filter through to Industrial Design staff in time. The first time that an academic staff member was aware that there was a student with a disability enrolled in the Industrial Design course was when Anne attended the first lecture for one of the core units of the degree.

The subject, Design Issues and Principles, will be used as the focus subject of this case study. It was structured so that students attended weekly lectures as well as participating in 3 modules: (i) a hand-drawing practical, (ii) a model-making practical, and (iii) tutorial sessions.

#### **2.1.1 Location**

The Industrial Design degree is offered at Penrith campus, which is one of the six campuses from which the University operates. Due to this campus operating across two separate sites, and its size and layout, it is a significant challenge for anyone without a car to move between the buildings which are located at different ends of the campus. Unfortunately, the various activities for this subject were scheduled to take place at locations that were at opposite ends of this large campus. Consequently, this distance provides an additional strain for all students.

### **2.1.2 Assessment**

A brief explanation of the subject's assessment requirements is necessary to illustrate some of the issues encountered by staff and students. Each module in Design Issues and Principles consisted of various assessment tasks. The hand-drawing module required students to learn perspective drawing techniques and use rendering equipment. Large raised drawing tables were required for these exercises. The model-making module required students to use workshop machinery, hand-tools, and spray booths, with the outcome being a small prototype/model of a mobile phone. The tutorials required students to undertake library research, prepare written work, and present an oral presentation.

### **2.1.3 Action**

A meeting with the Disability Office, Anne and her parents, and relevant Industrial Design staff was organised. The purpose of this meeting was to develop an Academic Integration Plan for Anne and to assist the Industrial Design staff in making the necessary accommodations to facilitate her participation in the course. This meeting occurred in the second week of the teaching semester.

Following this, an Industrial Design staff meeting was held to consider strategies that would allow Anne to achieve the required learning objectives for the subject. This caused substantial debate and raised a number of issues including the physical requirements of working in the Industrial Design profession. Some of the staff members were of the opinion that a student who is unable to achieve the physical requirements of the assessment tasks should not be allowed to enrol in the degree. Other staff argued that Anne's situation was a pedagogical challenge for the staff, and that it was the staff's responsibility to devise appropriate tasks that would enable Anne to fulfil her ambitions.

Ultimately, the University was bound by the Disability Discrimination Act which states that it is 'unlawful for tertiary institutions to discriminate against people on the basis that they have, or may have, a disability' [1]. Consequently, the School worked quickly to alter physical barriers and assessment tasks through measures such as installing ramps and providing alternative assessment tasks in order to make Anne's experience at UWS as 'inclusive' as possible. The problem with a number of the recommendations was that they were hurried 'band-aid' solutions. Many of these were not necessarily adequate enough in addressing Anne's educational needs, and certainly not mindful of the implications of such measures for potential students with disabilities.

One of the provisions organised for Anne by the Disability Office was that she have a note-taker during lectures. Initially, Anne seemed to attend the lecture presentations without incident. However, a major problem became apparent when staff noticed Anne driving her electric wheelchair along the dangerous narrow university roads from one part of the campus to another since her timetable required attendance at distant venues. Furthermore, workshop tasks of constructing physical models involved manipulation of materials, and use of hand tools, and Anne advised that as she had very limited fine motor skills, she could potentially harm herself if she was required to perform such tasks.

The Disability Office, in consultation with Industrial Design staff, decided to provide Anne with a laptop, thus enabling her to learn to construct virtual models through the use of 3D software. Anne was disappointed that she could no longer participate in the activities undertaken by her peers, particularly workshop tasks. Furthermore, Anne's challenges were compounded by the laptop arriving nearly halfway into the semester. Unfortunately, Anne did not complete her first semester and deferred her studies.

### **3 CHALLENGES**

Teaching effectively to a diverse cohort of students with a range of learning styles and needs can be very challenging. Further challenges can manifest when factors such as 'disability' need to be taken into consideration. Imperative to this paper is the acknowledgment that physical impairment is not necessarily aligned to cognitive ability. The assumption is that the student is not mentally delayed or impaired; rather the student has physical impairment(s). Furthermore, it is taken as given that cognitive development may be acquired through the achievement of particular skills, which may or may not include achievement of skills requiring physical manipulation of tools, equipment and materials.

In order to effectively devise an inclusive curriculum a lecturer needs ample time, access to specialist resources and perhaps professional development. Otherwise the approach to developing this curriculum may be made without understanding the implications for, or impacts on, the student's learning experience. The inclusive curriculum enables students with unique needs to maximise their potential, thus pioneering their contribution to the discipline of Industrial Design and henceforth, society.

### **4 STRATEGIES FOR ACHIEVING OBJECTIVES**

In preparing to deliver a subject/module, the expectation is that the lecturer would ascertain the outcomes that they wish to have students achieve. Traditionally, such outcomes would require the setting of specific objectives that explain how the student will achieve the outcome [2-4].

The proposal here is to begin with an inclusive approach that encompasses the needs of all students. The educator should have a clear understanding of the objectives they wish students to achieve and then they should work towards developing a range of ways for achieving such goals. It would follow that the desired skills could be achieved by students performing any one of a variety of tasks. Such a strategy and philosophy of Industrial Design pedagogy has strong links with the practise of Universal Design.

Universal Design is not new to Industrial Design; however the term's usage is generally associated with product design outcomes [5-7]. The term, though, could be extended to encompass the development of Industrial Design or other discipline's curricula.

## **5 TEACHING METHODOLOGIES**

From the case study described earlier, it can be seen that the methodologies applied to assist Anne were varied, and they helped her to achieve some of the intended subject outcomes. These were achieved through the modifications made to the teaching strategies, such as replacing the array of tasks that required manual dexterity with computer modelling, which enabled the student to accomplish outcomes with some sophistication that she would otherwise have been unable to do.

The two areas which required the most attention were the methods used to teach and learn traditional hand-modelling skills and traditional hand-rendering skills. For example, the ability to manipulate hand tools, sculpt material and learn workshop skills proved difficult for Anne. Safety was a primary concern, therefore she was asked to translate her understanding of three-dimensionality to a two-dimensional level. That is, the student was equipped with laptop computer and 3D software and asked to learn the software in order to achieve a 3D model, which would be produced by a rapid prototyping machine. Whilst the student accepted the need to undertake the alternative task using the computer, she did not appreciate being segregated from the rest of the class and felt disappointed in not being able to use traditional hand-modelling tools and materials.

Repercussions of this strategy are difficult to gauge and need further investigation. For example: was the student disadvantaged by having to learn a software package rather than participating in the workshop? Did the outcomes equate to the intended outcomes of the workshop project? How was the student assessed? How will these be addressed so they can be gauged?

The teaching of traditional hand-drawing and rendering techniques raised further issues. The student was given a project brief equivalent to her peers, yet she had demonstrated and communicated that her fine motor skills were very limited, a skill that is normally expected of designers. This raises interesting questions about how one communicates a concept. Does the drawing need to be exquisitely executed? Does it need mastery of traditional marker technique? Are there other means by which to communicate a concept? Do words (language) coupled with naïve sketches communicate efficiently enough?

## **6 CONCLUSION**

In summary, this experience has highlighted the lack of awareness among academic staff of the need to accept responsibility for developing an inclusive curriculum. It has also revealed that effective implementation of an inclusive curriculum requires substantial consideration, time, planning and resources. For this to be successful, an integrated approach involving relevant staff across the University is essential. Reflection on the issues raised by the above case study has, at this stage, generated more questions than answers indicating an important and rich opportunity for further research.

## REFERENCES

- [1] Office of the Academic Registrar, UWS Calendar 2005, University of Western Sydney, Penrith 1444-7770, 2005.
- [2] Marsh, C., *Becoming a Teacher: Understanding, Knowledge, Skills and Issues*, 3rd ed. Pearson Education Australia, French Forest, NSW, 2004.
- [3] Barry, K. and King, L., *Beginning Teaching and Beyond*, 3rd ed. Thomson Social Science Press, Southbank, Vic, 1998.
- [4] Briggs, L. J., Gustafson, K. L., and Tillman, M. H., *Instructional Design: Principles and Applications*, 2nd ed. Englewood Cliffs, New Jersey, U.S.: Educational Technology Publications, 1991.
- [5] Whitman Veryzer, R., Habsburg, S., and Veryzer, R., Managing the Challenge of Design for Innovation. *Design Management Journal*, Vol. 10, No. 4, 1999, pp. 29-34.
- [6] Mueller, J. L. and Design Management Institute (Boston Mass.), Leviton Manufacturing Company, Inc.: *Universal Design Marketing Strategy*, vol. 1. Boston, MA, US: Design Management Institute, 1997, pp. 17.
- [7] Mueller, J. L. and Design Management Institute (Boston Mass.), Leviton Manufacturing Company, Inc.: *Universal Design Marketing Strategy: Epilogue*, vol. 1. Boston, MA, US: Design Management Institute, 1997, pp. 2.

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