INTERNATIONAL CONFERENCE ON **ENGINEERING AND PRODUCT DESIGN EDUCATION**
4 & 5 SEPTEMBER 2008, UNIVERSITAT POLITECNICA DE CATALUNYA, BARCELONA, SPAIN

USING INDUSTRIAL DESIGN EDUCATION TO SURVIVE IN THE 'CORPORATE' WORLD OF HIGHER LEARNING AND RESEARCH

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ABSTRACT
This paper discusses a strategy on how Industrial Design can gain more leverage within the university system through an educational concept of hierarchical and collaborative learning. This educational concept opposes the traditional method of classroom teaching, but promotes an interactive way of customised learning and knowledge transfer. To support this educational concept, the issue of how to integrate Industrial Design into the playing field of a globalised University research and education system have to be revisited by redefining its three cornerstones, 'Teaching', 'Research' and 'Administration' into respectively 'Mentorship', 'Scholarship' and 'Service'.

Keywords: Hierarchical and Collaborative Learning, Industrial Design Education, Mentorship, and Scholarship & Service

1 INTRODUCTION

Your job includes two primary tasks. Task one will earn you an increased salary, will secure your professional mobility, will enhance the reputation of your employer, will result in invitations to attend interesting conferences nationally and internationally, and can be done on a flexi-time basis and at home. Task Two is unlikely to enhance your salary, save your tenure decision, or increase your professional mobility significantly and may, if pursued with too much enthusiasm, undermine these [1].

The above statement illustrates a cleavage, which is frequently institutionalised and experienced in unsettling ways at an individual level. The corporate world of higher learning and research places increasingly higher demands on numbers of acquired research funding and research publications. These demands have been fuelled by globalisation trends in the area of economics and politics.
Being classified under professional practices and having its roots in the visual and plastic arts, it has been discussed many times, whether Industrial Design should or should not be part of formal University education.
Presently three types of design schools can be identified. Type 1 is the Art and Design schools or 'Kunsthochschule' in German. These schools are not affiliated to any University, usually offering a wide variety of Art and Design Courses. Type 2 design schools are partly independent. They are affiliated to a University, but have managed to convince top university management to operate and be administered according to different criteria. Examples of such design schools are: Umeå Institute of Design

(Sweden), Academy of Arts & Design, Tsinghua University (China), Nanyang Technological University, School of Art Design and Media (Singapore)
The third type of design schools is part of a University system. They follow the University's rules and regulations and the emphasis is usually placed on research. The education supporting this research is scientifically oriented. Examples of Design Universities are Norwegian University of Science and Technology (NTNU), Delft University of Technology (TUDelft), National University of Singapore (NUS), Department of Industrial Design, Technical University Eindhoven (Netherlands).

2 REDEFINING RESEARCH, TEACHING AND ADMINISTRATION

Benefits of greater synergies between research and teaching have emerged, which are significant for tertiary design educators, institutions, as well as funding and reviewing bodies. Considering research-rich teaching, educators who are active researchers are more likely to be on the cutting edge of their discipline and aware of international perspectives in their field.
Research or inquiry based teaching occurs when these teachers shift the focus of student learning from the acquisition of subject content, of outputs, to involving students in interdisciplinary research processes and design activities. In the following paragraphs, the redefinition of higher education corner stones and shift from research to scholarship, teaching to mentorship and administration to service will discussed in detail.

2.1 From research to scholarship

Scholarship becomes the interactive link between research and teaching. Teaching activities of the scholarly educator are essential to the success and growth of an academic environment and require appropriate academic recognition. Scholarship in education should be identified, recorded, and assessed as scholarly accomplishments for academic recognition [2]. This is supported by the following four ingredients of scholarship within an academic scholarly environment [3]:

1. *Discovery*: search for new knowledge and definition of what remains to be discovered.
2. *Integration*: interpretation of the meaning of knowledge and fact and interconnecting knowledge into concepts and structures.
3. *Application*: utilisation of knowledge in solving actual problems or altering and evolving knowledge to resolve a problem.
4. *Teaching*: knowledge transformation to develop ideas into usable concepts.

However, for this to occur there needs to be Research-based learning, where academics take an active, scholarly approach to their teaching. They reflect upon their role as learners, using their expertise as researchers, in their interactions with students, to understand how their teaching practices enable students to successfully learn in and contribute to their disciplines, so that they are always empowered and prepared for the complexities of the modern world.
From this research-based learning perspective, the academic adopts a heuristic approach to teaching where the 'apprentice' is encouraged to learn the professional art of research by mind-interaction and joint experimentation with the 'master' [4]. This 'apprentice' - 'master' relationship is based on joint acquisition of scientific knowledge in a field of study and usually directed towards a specific problem field. The benefit of such a relationship is mutual. On one hand, the 'apprentice' in this case, the student, gets direct access to the latest knowledge and ideas of the 'master', in this case, the researcher. On the other hand, the researcher can tap on the student's enthusiasm and energy to assist him or her in the quest for new knowledge.

2.2 From teaching to mentorship

Good teaching comprises of the following four essential qualities: (i) knowledge, (ii) the skills to convey that knowledge, (i) the ability to make the teaching material interesting and relevant, and (iv) a deep-seated respect for the student [5]. These are complemented by Boyer's suggestion that good teaching is characterised by the same mental rigour associated with research, not only to improve the faculty's classroom, but also to advance knowledge and practice beyond it [3].

Sachdeva sees mentorship as a more global and long-term responsibility for development of the apprentice [6]. For many, the mentoring relationship comprises more personal, closer relationships that demand time, commitment and a level of emotional engagement [7] Hereby, the relationship between master and apprentice is crucial, whereby desirable qualities of the former have been identified as follows: knowledge, enthusiasm, a genuine respectful interest, approachability and friendliness, patience, ability to challenge and good communication skills [8]. Considering the needs of the apprentice, mentoring as a source of learning has become particularly relevant given the boundary-less nature of careers today where changing organizational structures create the need for fast-paced learning [9]. Practically, there needs to be a mindset receptive of new ideas and readiness to invest time and effort to continually reflect on practices and to engage in exploring innovative ways of strengthening the teaching, learning and inquiry connection, as well as its outcomes [10].

2.3 From administration to service

Within the context of globalisation, privatisation and market-like behaviour in the public sector have led to major changes for Higher Education policy-making and practice [11]. Rigidly administrated knowledge production was previously criticised on the basis of being the product of the nineteenth century industrial society where universities were elitist and the knowledge they produced was linear and compartmentalised into separate disciplines and subjects [12]. It excludes potential actors and creators of application-based knowledge, and denies the existence of multiple sites of knowledge production. On the contrary, in today's global competition, a proactive service attitude in promoting and marketing its higher institute of learning has shifted knowledge production to cross-disciplinary, application driven, non-linear and transient, expanding the number of research or knowledge actors [13, 14]. Besides this, universities are increasingly losing their monopoly on knowledge production, because new media enables companies, trading in the information industry, to offer "expert" teaching to the growing audiences of higher education. This present situation of knowledge production is characterised by (i) production in the context of its application; (ii) trans-disciplinarity; (iii) heterogeneity in the skills needed for its mastery; (iv) enhanced social accountability; and (v) a broader base of quality control [15]. This means that from a higher educational perspective collaborative learning will be encouraged through partnerships between Universities, the public sector and industry in the production and distribution of research and project work, and that the transformative curriculum should be based on trans-disciplinary activities.

3 TOWARDS SCHOLARSHIP AND MENTORSHIP IN DESIGN

According to *The American Heritage Dictionary of the English Language*, the term professional refers to a skilled practitioner or expert who is engaged in, and earns a living in a given or implied occupation, conforming to the standards of a learned profession. Examples of professional occupations are law, medicine, architecture and design. To develop and protect these professions, accreditation bodies and

organizations, such as The Royal Institute of British Architects (RIBA), The Law Society, Societies of Certified Public Accountants (CPA), The Society of Human Factors and Ergonomics, etc. were established at an early stage.

However, as technology progressed and the quest for knowledge accelerated in the past few decades, the effectiveness of professional organizations in guaranteeing professional protection is questionable. For example in the field of architecture, new materials, building methods and requirements on living have partly transferred design activities towards other professions, diminishing the creative and intellectual authority of the architect. In the medical field knowledge acquisition has been put as a pre-requisite for practice. Unlike in before the 80's, newly graduated medical doctors in the Netherlands have to first obtain a PhD.-degree, before they can enrol in a specialist traineeship, mentored by a senior practitioner.

According Maslow's Hierarchy of Needs, needs are arranged from most to least pressing [16]. In order of importance, they are physiological and safety needs (category 1), followed by social, esteem, and self-actualisation needs, (category 2). Professions, serving in category 1 needs, are considered to be valued and least subject to criticism, whereas professions serving category 2, are subjected to severe internal competition, a lack of collegiality, and a loss of sense of common responsibility. Examples of category 2 professions are usually related to the creative sector, such as architectural-, Industrial-, Interior-, graphic design, etc. From a scientific standpoint, category 2 professional studies are stigmatised as being too practice oriented, without having a mindset towards inquiry and knowledge advancement. Therefore, it is most important that educators, students and alumni join forces to elevate these professions through a structured network of scholarship and mentorship within a university environment, supported by industrial and research collaboration. The essence of such a network is the development of a master-apprentice relationship, where both continuously aim to challenge and advance their professional field through practice and / or research. However, such a learning structure has been criticized from an ethical viewpoint by some educationalists claiming the exploitation of the apprentice, as well as limiting his or her freedom of choice and aptitude towards independent learning.

From a design educational perspective, I strongly support a scholarship-mentorship model (Figure 1), because of two main reasons.

1. Learning from a 'good' master through close interaction stimulates and nurtures intellectual curiosity. It enables students to become sophisticated thinkers by developing their capacities for critical reflection and independent thinking.
2. Professional education requires much more effort and time in course preparation and delivery compared to other fields of study, leaving not much time for the educator to conduct research and advance him- or herself scholarly. Therefore, it is justified to persuade the apprentice to practice or search for new knowledge in the master's field of interest.

The following example illustrates the difference between conventional learning and teaching versus collaborative learning and scholarship in Industrial Design Engineering. In a conventional situation, a student receives a design assignment in the form of an ill-defined problem. He or she will be guided to solve this problem using a basic, systematic design process [17]. The final outcome of the assignment is usually a materialized design proposal, visualized through a mock-up, prototype or animated Computer-Aided Design (CAD) models. In this case, the master will merely be rewarded with exemplary material to be used for next semester's teaching.

In collaborative teaching and learning, students will be challenged on a design practice, as well as design methodological aspects. In addition to being supervised to solve a design problem in the form of a materialized outcome, the student will also be guided

on how he or she manages the design process, as well as experiments with new methodologies. The results of these experiments and formation of new methodologies is publishable and advances a certain form of design thinking.

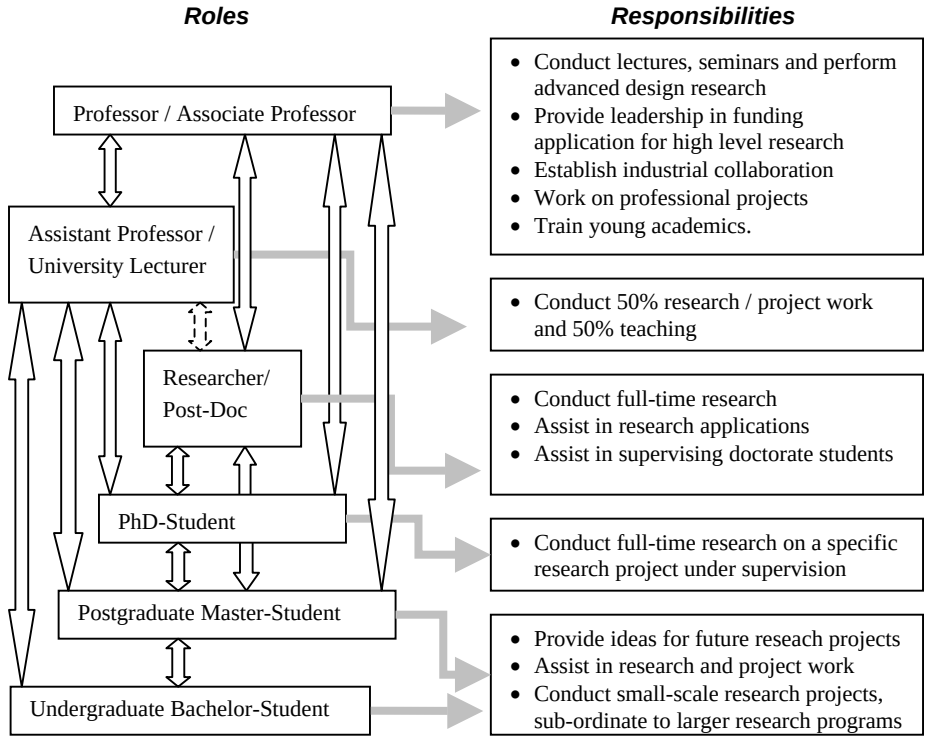

Figure 1 Collaborative-learning model: a hierarchical structure towards mentorship and scholarship

4 DISCUSSION

The redefinition of cornerstones recreates ample opportunities for design communities and individuals to consolidate their educational, professional and research activities towards a common goal of knowledge creation and professional advancement in the field of design. In support of hierarchical learning within Industrial Design, the concept of "Vertical Studio" learning and knowledge transfer is one of the organizational methods to facilitate mentorship and scholarship, which is the interactive link between research and teaching. Based on this concept, results have indicated that successful collaborative learning and knowledge transfer should rely on:

- A common interest among educators, students, industry and research councils to further the field of study beyond traditional learning.
- A vision and strategy for knowledge and skills building through sponsored, long-term collaborative research and development projects.
- A well defined overall educational and research plan on how to manage and coordinate long-term projects into smaller ones with intermediate, connecting milestones.
- A master-apprentice relationship throughout all levels of the 'learning' organisation.

- Clearly defined roles and tasks among the members within the 'learning' organization, aligned to the classification and sub-classification of the overarching research and/or development project.

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