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Book Review: Re: Research, Volume 1: Teaching and Learning Design

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Introduction

Published by Intellect, this book, *Teaching and Learning Design*, has emerged from the proceedings of the Re: Research – 2017 International Association of Societies of Design Research (IASDR) Conference at The Myron E. Ullman, Jr. School of Design, in the College of Design, Architecture, Art, and Planning (DAAP), University of Cincinnati. This volume, *Teaching and Learning Design*, is first in a series of seven thematic volumes, each presenting an edited collection of papers on topics as wide-ranging as philosophical frameworks and design processes, to design discourse on business and industry.

In the foreword and introduction to this book, the editors set the context: design research in the United States is still an emerging aspect of design practice and education, and thus far, it is industry that has played the most influential role in embedding research into design practices. The collection of papers is meant to reflect a snapshot of the diverse practices of design and design research as it is currently. The inclusion of a wide range of international perspectives and case studies in this book is refreshing, and there is no dominant Western leaning in its content. This collection of eleven papers by many different authors from across the globe demonstrates the increasing breadth of enquiry that is taking place in design education, and the expanding range of research models applied to the subject.

Teaching and Learning Design is not a practical guidebook to teaching design at university level or an inventory of pedagogical strategies but presents a range of projects and studies that seek to better understand design teaching and develop new models for facilitating learning and assessment. They vary in their depth of theoretical underpinning; some papers place emphasis on the description of specific projects, some of which involving testing/delivery across institutions and countries, or collaboration with external groups including industry.

There are a few observations that are common. Some authors raise fundamental concerns about the rigid structure of primary and secondary education (that do not appear to be limited to particular countries or cultures), and how this early conditioning of students to produce black and white answers to set questions negatively impacts their ability to approach design practice as an iterative process that requires a continuous cycle of development/feedback in order to problem solve. Indeed, the nature of design practice is highlighted in various forms in *Teaching and Learning Design* and discussed in relation to innovation and risk-taking; reflexive practice; inter-disciplinary approaches; and even the impact of having more than one possible

solution leading to learning pressures and stress. Additionally, a few papers highlight the value of the workshop-based format in design education, as well as the benefits of collaboration and industry engagement to the learning experience.

(Referencing note: Numbers in brackets refer to pages in *Teaching and Learning Design*)

'Opening a Design Education Pipeline from University to K-12 and Back', *by Peter Scupelli, Doris Wells-Papanek, Judy Brooks, Arnold Wasserman*
This paper describes a pilot study in the United States that explores how educators might teach K-12 students (the equivalent of primary/secondary education) and university design students to embed design thinking and learning with future foresight. The project evaluates how a university-level Design Futures course (including content, approach, and teaching materials) can be adapted for use in K-12 Design Learning Challenges. The paper describes the K-12 design-based learning challenges/experiences developed and implemented by the Design Learning Network. This is a descriptive piece with some interesting ideas for cross-level exchange, involving different demographic profiles of students.

'Re-Clarifying Design Problems through Questions for Secondary School Children: An Example Based on Design Problem Identification in Singapore Pre-Tertiary Design Education' *by Wei Leong, Leon Loh, Hwee Mui, Grace Kwek, Wei Leong Lee*
This study is based on an observation that secondary school students in Singapore often define design problems in their coursework at a superficial level 'due to various reasons such as lack of exposure, inexperience and the lack of research skills.'(25) The project involved the use of questioning techniques to develop critical thinking, enabling pre-tertiary students to improve their understanding of design problems. Through critique of their thinking and approaches, more effective design solutions were generated. The study used student design journals to document processes and reflection/ evaluation at each stage of development. This qualitative approach adopted captures the learning journey from design problem identification to proposed solutions.

'Surveying Stakeholders: Research Informing Design Curriculum' *by Andrea Quam*
This paper proposes the necessity of using surveying methods as a research tool to define the content and structure of the curriculum, specifically in relation to design education. According to the author, 'neither the creation of design curriculum, nor the revaluation of existing curriculum is well documented.'(49) This paper presents the use of a broad survey to assess existing curriculum at Iowa State University in the United States, which reflected the needs and perspectives of the program's diverse stakeholders from students and staff, to industry professionals, in relation to the design curriculum. The collection of data and analysis of the outcomes of the survey informs curricular decision-making; the transparent and inclusive approach of the survey enabled 'the reduction of faculty bias and speculation in the process.'(50)

New Challenges when Teaching UX Students to Sketch and Prototype *by Joep Frens, Jodi Forlizzi, John Zimmerman*
This paper argues that UX students sketch and prototype differently in comparison to other design students, and that changes in the field requires a change in educational approaches,

whereby sketching and prototyping is regarded as a continuum, an ongoing process of 'double loop learning'. (62) Three new challenges highlighted include new computational design materials; new maker tools; and changes within the tech industry. These challenges were explored through examples with their students, and steps forward suggested in design education. These are proposals for a contemporary approach to teaching UX, whereby design education has somewhat lagged behind industry practice and application.

How to Teach Industrial Design?: A Case Study of College Education for Design Beginners *by Joomyung Rhi*

This paper presents the way a Korean university structures a course on industrial design, describing the process and outcomes of the first stage of industrial design education through an 'autobiographical' method (78). According to Rhi, this type of autobiographical research promotes positive reflection and allows for greater refinement of learning and teaching approaches over time. Highlighting the importance of self-reflexivity, open dialogue and exchange of ideas between tutors and students, the curriculum is delivered via studio sessions which are framed around two linked projects, involving an increased level of complexity as students develop their concepts. Teaching and learning entailed a 'continuous task-feedback cycle process' (89), where design concepts, principles, processes and methods etc., were embedded in weekly sessions. Rhi suggests that through the autobiographical way of looking at the class, the researcher was able to reflect on the strengths and weaknesses of the approach to learning and teaching, and to draw implications for future improvement.

Preliminary Study on the Learning Pressure of Undergraduate Industrial Design Students *by Wenzhi Chen*

This study explores the issues causing learning pressure in undergraduate industrial design students in Taiwan, as well as their pressure management strategies employed to cope with these pressures. Chen states that the nature of design development entails a process of 'learning by doing'(92) and the significant amount of time required to solve problems creates time management pressures in meeting assignment deadlines. The study proposes that the requirement to solve real design problems creates heavy working loads which may in turn lead to learning pressure. It also explores ways in which these students manage learning pressures, such as engagement in leisure activity and problem solving.

Whilst the sample surveyed for this research focused on industrial design undergraduates, the outcomes and analysis may be applicable to any student (i.e. the learning pressures described can be attributed to most UG students) and the specificity of the study to industrial design remains unclear.

Rewarding Risk: Exploring How to Encourage Learning that Comes from Taking Risks *by Dennis Cheatham*

This design research project was undertaken with Miami University Graphic Design students to discover curricular formats that could encourage students to risk failure 'by attempting innovative outcomes that exceed prescribed learning objectives.' (106)

The trial-and-error process of defining problems and exploring possible solutions is iterative, where 'failures' are part and parcel of the developmental process. Cheatham states that primary and secondary education in the United States is 'prescribed and linear' (105); hence, students are conditioned to find black/white answers from early education, and this is limiting them from undertaking risks and finding innovative design outcomes. He also proposes that a focus on formative (instead of summative) assessment as a significant part of the learning process may encourage increased risk taking. Citing student motivation when developing learning experiences as an important factor, this awareness could help students make the transition to practicing design as an iterative process fraught with risk, which will in turn lead to more innovative solutions.

An Analysis of the Educational Value of PBL Design Workshops *by Ikjoon Chang, Suhong Hwang*

Carried out over 2 weeks in 2017 at Korea's Yonsei University, the purpose of this study was to design and deliver design workshops based on project-based learning (PBL) and to examine their educational value for students.

The workshop format encourages direct and proactive participation from students; and this study involved a workshop which was composed of eight teams of students from three countries, including Korea, China, and Japan. An important element of the workshop was to connect the participants with businesses, which is also an important component of design education. The questionnaire conducted at the end of the workshop reflected the ample educational value of the workshop format, even though there was a less favourable response in relation to industry input, which requires further exploration and analysis.

The workshop format in learning and teaching 'is synonymous with communal education and team-based education.' (118) In contrast to traditional teaching approaches that primarily rely on the delivery of information to participants (such as in a lecture theatre), workshop education relies on engagement and participation.

Collaborative Design Education with Industry: Student Perspective by Reflection

by Nathan Kotlarewski, Louise Wallis, Michael Lee, Gregory Nolan, Megan Last

This paper proposes that student reflection on academic and industry collaborative projects can enhance student's understanding on the design process to solve live industry problems. The study is based on a 2017 learning by-making (LBM) unit, where Furniture, Interior and Architecture students in the School of Architecture and Design, at the University of Tasmania, Australia, collaborated with Neville Smith Forest Products Pty. Ltd., a local Tasmanian timber product manufacturer who stockpiles out-of-grade timber that has limited market applications, to value add to their out-of-grade resource in this LBM unit. Through a series of design challenges, observations of industry practice and access to timber materials/supplies, students were exposed to live industry problems and opportunities to build professional design skills.

This study presents how student reflections influenced their design process as they responded to design challenges to address an industry problem. This was illustrated by incorporating Valkenburg and Dorst's (1998) reflective practice framework against student's transformative learning process development.

Collaborative learning environments bridging industry and academia expose design students to live industry problems that enhance their professional development and build confidence to approach design opportunities in the real world, where outcomes produced need to be feasible and commercially viable.

Interdisciplinary Trends in Design Education: The Analysis of Master Dissertation of College of Design and Innovation, Tongji University *by Lisha Ren, Yan Wang*
Explored within the context of historical Chinese design education, current design education at Tongji University is explored, based on an analysed sample of 458 Master theses from the College of Design and Innovation between 2010–2016. Through the coding of subject classifications, quantitative analysis and content analysis, the interdisciplinarity of education is explored from the two perspectives - the extent of cross-disciplinary practice; and the relationship between different cross-disciplinary directions.

The authors posit that interdisciplinary design is crucial in solving complex social problems and promotes the development of social innovation. Since the 1980s, China's rapid economic growth and the demand for design professionals increased dramatically, leading to the large-scale development of design education as well. In order to deal with modern day challenges, a more open and inclusive understanding of design is required; where a series of emerging design areas that are mostly interdisciplinary and innovative, such as interactive design and service design, have been spawned. Following the lead of other countries, China has gradually established interdisciplinary laboratories and formulated its 3D 'T-shaped' Design Education Framework (143), developing interdisciplinary knowledge, integration of innovation and design methods.

The outcomes of the study reflected a great degree of 'interdisciplinary performance'. (151) Furthermore, the interaction of design disciplines with non-design disciplines is also reflected in a significant number of Master dissertations, especially the integration between industrial design and environmental design with psychology, materials science, behaviour science and other relevant disciplines.

From ANT to Material Agency: A Design and Science Research Workshop *by A.L. Renon, A. De Montbron, A. Gentes, J. Bobroff*
This paper provides a study of a design workshop that investigates a complex collaboration between physics and design. Using methods and concepts of the Actor Network Theory (ANT), the study explores the ways student projects were developed over time and through a diversity of inputs and media. Employing a semiotic and pragmatic approach, the analysis observed three operations ('aesthetical formations') that appear to be key to understanding design practice: translation, composition, and stabilization.

The researchers state that the radicality of the experiment lay in the fact that 'fundamental physics is intangible in essence and the starting point of the design project is therefore abstract. However, the designers took into account and invested the scientific material, which became both a tool and a function for exploration.' (167) Material agency inherent in any design process does not refer only to tangible objects, but is 'made of iconic, technical and semiotic dimensions.' (167) Students draw from a range of associations in the design process and these

'aesthetical formations'(157) as described by the authors highlight 'not only a personal, subjective experience but also a cultural and historical situation, as well as a social space of communication.' (168)

Conclusion

In *Teaching and Learning Design*, authors discuss the nature of contemporary problems and propose teaching and learning strategies in the context of an increased need for interdisciplinary engagement and technological change. It is interesting to note the similarity of some of these challenges as identified by authors from different countries, and also the variation in educational frameworks and processes, for example, curriculum design. Although the wide range of studies presented mean the book may not be universally relevant to all design educators, the ideas offered are nonetheless food for thought.

Overall, the volume as a whole captures the wide range of work happening in design education today, highlighting a few exciting developments in approaches to teaching and learning.

References

Valkenburg, R., & Dorst, K. (1998). The reflective practice of design teams. *Design Studies*, 19(3), pp. 249–271.