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Teaching Creativity:

Developing Experimental Design Studio Curricula

for Pre-College and Graduate Level Students in China

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Abstract

This paper attempts to demonstrate challenges and opportunities in design education in greater China, by focusing on two diverse steps of teaching design creativity, while depicting experimental design curricula. Two programs have been run in two different universities in Hong Kong and in Shanghai. Both cases tackle with deployment of unconventional content that departed from the methodology used to-date on the particular programs or level of education, in an attempt to generate alternatives of conventional teaching patterns.The initial discussion is articulated around the Summer Program in Architecture at The University of Hong Kong, which aimed to teach design and creativity to an audience with minimum to none previous experience and encourage them to choose this path as well as the particular institution for their further education. The second part is conveyed through a Graduate Studio at the College of Architecture and Urban Planning at Tongji University in Shanghai, which aimed to explore connections between use of crafts and digital processes in architecture design and form making.In both programs, design tasks are based on basic perception levels of space and form, which have been investigated progressively by students, through correlated workshops and lecture topics that have been also discussed in the sub-sections. The paper is concluded by emphasizing the improvement of students' abilities, skills and expertise in relation to the diversity of the groups.

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Keywords: Teaching Creativity, Experimental Studio, Pre-College Design Education, Graduate Studio Education, Architectural Education, China.

1. Introduction

Departing from the challenges of teaching design creativity in a potentially closed, static and didactic education system, this work intends to reflect the agenda of experimental design education programs being developed, avoiding repetition of any cliché or the stereotypical education methods. Being run at the University of Hong Kong and Tongji University, this work conveys the diverse studio structures and output by discussing them through consequent sub-sections.

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The discussion starts with depicting the teaching goals and design agenda that have been immensely affective in the curriculum development of each program. The discussion is continued by mapping the teaching strategies and assignments of each program, and concludes with closing remarks.

2. Teaching Goals and Agenda

With an attempt to reflect the benefits of experimental processes as well as opposing to the existing didactic education patterns, and creating alternatives, both pre-College and graduate level programs have been configured around certain guiding principles.

As the top-down "push" model of "spoon-feeding", the education environment has difficulty to enable an interactive, self-paced environment that is driven by participation, "Establishing Critical Thinking" emerges as the vital principle in the education agenda. To maintain the basis of 'thinking on' architecture idea, an interactive "pull" model is adapted, to encourage students in terms of expressing their ideas and comments about themselves or their team-mates' more interactively through pin-ups, as well as interim reviews or informal inter-group discussions. A voting system is also included during and after reviews to have students select their most and least favorite, which is further catalyzing the peer-critique environment.

On the other hand, building up on the previous principle, "Initiation of Basic Observation Skills" appears as the other key principle in the education agenda. The design exercises tried to enable students to look, see and understand things around them in order to use it as a part of an idea or solution they are developing. Both explicitly during lectures, workshops and fieldtrips, as well as implicitly during studio, teaching team helped students sharpening their observation skills by amplifying critical thinking.

"Improving Individual Expression" is another principle that was being able to realize by promoting teamwork, keeping studio assignments brief but branched-out. A number of exercises and reviews have been generated to enrich students' presentation skills, while giving them opportunities to improve and invent their own expression ways.

Nevertheless, "Encouraging a Personal Design Vision" has also acted as one of the crucial principles. Being one of the critical pedagogic goals in programs, teaching teams refrain to give explicit directions to student. Leaving students more room to react has enabled students see different aspects of the design problem and encouraged them to make 'mistakes' as they discover, where their natural strengths and weaknesses lie.

Last but not the least; "Building Multi-disciplinary Links" enabled the curriculum to have the presence of major fields of design. Students are intensely exposed to range of lectures and workshops. These of course are intimately related with the knowledge and ontology of architecture. Bringing these diverse fields together automatically allowed programs for potential contribution opportunities within the community. The intentional scheduling and controlled outline of lectures implicitly enabled students connect architecture into different domains.

3. Teaching Design Creativity in Pre-College Level

Since its inception in 2004, the summer program in architecture at the University of Hong Kong (HKU) has attracted students, who are interested in architecture as a future career as well as life as a student in HKU. For the first time in year 2009, the program got a complete makeover in content: Instead of having two 'architectural projects' over three weeks, the program is divided into six small, but inter-connected segments, which enable students have better integration with notion of space through gradual cognition of flexible spatial relations, as well as body and time.

The education system in China, mainly structured around the examination processes, instead of an individualistic focus on enhancing personal strengths, where secondary education students need to take a series of tests to determine their tertiary education based on assessment authority's directives. One of the main goals of the makeover was creating an alternative to this environment, a program focusing to assess and develop students' natural abilities to help them make the right decision for their future. Thus the idea of 'thinking on' architecture, rather than 'teaching

of' architecture were adopted. To realize this idea, the time spent in studio compared to previous programs is increased considerably.

An environment that promotes learning through experimentation and observing peers has been provided, along with establishing simultaneous interaction and provocation of small-scale debates during studio. In contrast to this, pseudo-models of didactical education have been strongly avoided.

3.1. Teaching Strategies

To apply the principles listed above, 2009 summer program has developed various teaching strategies, pedagogical and organizational choices. The idea of designing the curriculum as one big studio was the key and departing decision to structure the rest of lectures and workshops based on it.

To deliver the teaching strategies teaching team played a key role. A team of internationally diverse young professors and teaching assistants is selected by maintaining the majority with Chinese origin with an abroad education. The team of studio instructors was not only responsible of their individual groups, but also mentoring of the teaching assistants. All teaching assistants were also fully delegated to take charge in related workshop topics, assigned based on their own ranking of preference and offered freedom to develop their own content for the workshop sessions they have selected.

Breaking "architecture" into pieces was a strategy applied on top of the previous two ideas. Instead of expecting or urging students to understand "architecture", the program attempted to adapt a strategy to divide architecture into pieces and create a selection of items that can be tagged as "architecture", thus helping a high-school grader to approach and interact with diverse and complex relations of space-making more casually.

Providing materials, inferring architecture, completed the previous strategy. Giving clues, open-ended critique and relating student work with different fields connected to architecture, students are further motivated to define and build students' own links among things they observe and experience, hence developing their personal design vision.

Furthermore, as a complementing strategy to achieve the goal of granting the opportunity to each student to be individually distinct, as the ultimate teaching strategy the teaching team avoided using 'architecture' label, minimizing the 'push' towards students' own reference system. This also avoided any premature adaptation of any educational tradition teaching team might represent as a group or individually.

3.2. Assignments

Three-week summer program is divided in six studio exercises, two for each week. Each studio pair is connected with each other as they relate or built upon previous studios in a larger perspective. This gradual intensification is derived from foundation and core studio levels of architectural education, where assignments shift from abstract spatial relations into more tangible structure of a design problem, namely the formation of space as well as its spatial components; further cascading down from macro-scale of 'multi-stratified' urban structure of Hong Kong into micro-scale of a surface element. Figure 1 visualizes the intended relationships among these studios. Brief descriptions of these episodes are as follows:
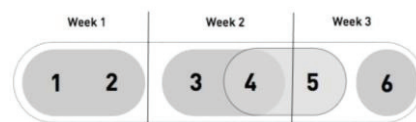

Figure 1. Sequential relations of the studio assignments

3.2.1. Fold

This introductory studio focused on the most abstract, yet most creative means on making space. Effect of folding has been undeniable in current architectural discourse. As seen and observed from different levels of undergraduate studio education throughout the world for the past decade (Vyzoviti 2003), it can be argued that folding is not only a

powerful process on generating spaces, but also greatly helped to achieve following two intentions: (a) establishing a tool on conceptual thinking on space, that does not require any previous architectural knowledge; (b) creating a medium to explore surface and space relations by enabling quick adaptations to transforming students' spatial ideas.

Besides the materiality of paper and the folding techniques that are allowed during studio has created feedbacks on thinking processes of students. On the following steps of the exercise, students also swapped and continued on each other's work, as they have been able to observe, analyze and understand each other and build up on it. Figure 2 shows two examples of the work produced by students during this studio.
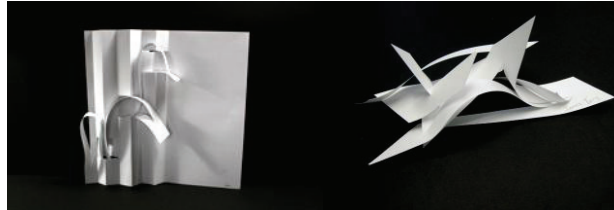

Figure 2. Examples of studio works from *Fold* exercise

3.2.2. Territory

Territory has built up onto the previous exercise, while letting students building on skills they gained during first exercise, to be applied on medium of wire mesh, that cannot be reshaped or unfolded easily, as well as being porous unlike paper. This 'one-way' feature of wire mesh is used to introduce an additional idea of scripting, to ensure students decide their actions or make a plan of sorts using a story they decide upon. As script enables both a procedure to develop geometry as well as suggest an experience in time, this exercise enabled students to focus spatial, ambient and emotional properties of territories they creating for themselves by limiting and defining boundaries. Relevant lectures and fieldtrip experience complementing studio further enabled students think on the notion of place. Studio exercise further pushed the above mentioned aspects to another level, by asking students to build a scaled version of their initial model using same material and requiring them to think about scale. Figure 3 show works of students produced based on scripts that they have implemented.

Figure 3. Examples of studio works from *Territory* exercise

3.2.3. Structure

Placed as the first studio of the second week, Structure allowed students to step out of the domain of space-making set temporarily by previous 2 assignments, to zoom in a specific target such as their own bodies as a structure. Strong emphasis is given on observation and analysis, and purposely-limiting abstraction as much as possible. Students only have given bamboo skewers and string. They are asked to recreate a pose of balance of their bodies by using a hard-boiled egg symbolizing their heads. This studio made students aware of notions of tension and pressure as they discover alternative ways on distributing loads of the egg to the ground (Yurekli, 2008). Figure 4 samples three key stages of the assignment: Posing, analysis and the resulting work.
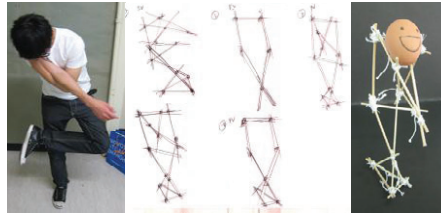
Figure 4. Examples of student's process during *Structure* exercise

3.2.4. Nest

This assignment, aimed to motivate students to detect relationships among previous studio exercises and bring things into full circle. The studio called in for teamwork to construct an inhabitable space. Thus nest has somewhat transformed the territory exercise to 1:1 scale, by putting a limit of size, and have students depend on properties of cardboard as material and required them to use a construction technique of non-glue joints. Student tackled concepts such temporality, context, among functional requirements, and human anatomy. Besides prior to studio, a lecture on fashion design and a workshop on a wearable body accessory were conducted in terms of introducing ideas of proximity and secondary skin to the students. Figure 5 shows two different examples of teamwork produced during studio.

Figure 5. Examples of student work from *Nest* exercise

3.2.5. Surface

Once the main components of architecture's 'reason of existence' have been introduced and explored, the focus of students have been diverted to one of the more speculative component, the surface. This studio focused on creating a part of a architectural envelope that can be structural. While students were able to focus on ideas of repetition and differentiation, they have been required to develop and execute their designs based on relationships by deploying parametric design principles through lectures and workshops. Figure 6 shows an example surface that is generated by using repetitive but differentiated modules.

Figure 6. An example of student work from *Surface* exercise

3.2.6. Body

Expanding onto one event from the last year's program, this activity made into a studio exercise and scheduled to take place on the day before last day of summer school. The aim of this exercise was to enable students to explore body-space relationships in time and looking ways of relating their body more to the space they are in and use their recently formed knowledge to that. Unfortunately this event got a last minute cancellation from its organizer, the

director of Hong Kong Contemporary Dance Company; therefore it will not be possible to make an evaluation of the outcome other than describing the original intent above.

4. Teaching Design Creativity in Graduate Level

Historically, embodiment and materialization of architecture is strongly based on crafts practices such as glass, masonry, carpentry and others. Fabrication and manufacturing technologies has transformed and reduced conventional use of crafts in architecture to interior styling rather than integrated structural as well as spatial solutions. Traditionally China and Chinese Culture have a long history of crafts and hand-made items as they span to various artistic fields and scales, which lasted strongly through ages.

Within this context, a graduate design studio in College of Architecture and Urban Planning in Tongji University is set up on crafts and their computational aspects to reveal the basic form of creativity in selected crafts, and to investigate the potential of re-linking crafts processes to contemporary digital design thinking and production. The pedagogic aim again structured around guiding principles set forth in the beginning. Encouraging students to step out of medium they used to express themselves enabled them to discover properties of materials that currently been idealized by use of automated systems. This enabled a process of learning material feedback and response and using of this information back to their design and thinking process.

4.1. Teaching Strategies

The studio is staged to apply a number of consequential teaching strategies: The first strategy to be applied is to inform about the past examples of the craft and different processing techniques. It is believed that teaching all the techniques and previous work in the beginning is essential on both outlining the limits and expectations of final outcome. During this time, students are also being instructed about digital modeling and generative design tools to be able to simulate processes thought using computer as a tool. Following this informative stage to instructors make an effort to encourage self-start on students' projects. To realize this strategy, students are being asked to bring their own ideas, based on what they have recollected from on the initial phase and their own interests. As students have shaped up their ideas on their own, instructors from different backgrounds of art, architecture and engineering has given simultaneous critiques to promote multidisciplinary thinking. This enabled students to start intersecting their ideas through different realms of these disciplines, while seeking results that satisfy these fields with improved aesthetics, and further enhancing structural qualities and added properties with potentials to become a prototype in any of the as students depart from the baseline thinking. Rigorous guidance applied to limit conventional results that might fall into any single category of art architecture and engineering and as well as into traditional craft category. Establishing a base regarding these limits through studio critique enables students to initiate self-control and self-guidance of their work to a more open ended direction, while assuring the students clarify their ideas on "what not to do". During this stage students are also exposed the basic concepts of computation as repetition, differentiation and recursion and enable them to further link their understanding of these concepts and ways they occur in crafts.

Moreover, students have been guided to simplify and abstract representations to in terms of eliminating any formal similarities through the sourcing field of crafts that might outcome with the work that has been developed in the studio. Furthermore students were encouraged to realize simulative and representative results using craft-techniques. These results were usually what they develop using digital tools or study models they developed. This was more or less a synthesis stage where students combine and output a result.

4.2. Assignments

The 18-week semester has divided into two modules, each driven by different crafts, consisting of weaving and glass.

4.2.1. Weaving

First studio module and the workshop explored possibilities in weaving. Whether utilizing string or bamboo in knitting to create wicker or basketwork, weaving establishes a system of independent lines under deformation, which resulted in an irregular transformation of curved elements. Surfaces emerge through the interlacing of lines that were deformed in more coherent ways as the lines tend to curve depending to each other. Thus the surface becomes as a structure through weaving, while soft elements become rigid and act as a group. This assignment has aimed to explore different kinds of weaving based on different materials and techniques as the schedule allowed, moving beyond the aspect of a mere decoration. As a result students have gained a brief insight onto digital simulation of weaving and its realization using proper materials, as they simultaneously receiving practical exposure to the material and get a first hand experience on different automated and manual phases of labor.

Figure 7. Examples of team and individual student work from Weaving and Glass studio

4.2.2. Glass

Second studio module and the workshop was focused on glass. As design development journey has started from the ancient Chinese art of *Liuli*, it has been persuaded by explorations towards various approaches in the fabrication, function, and design of glass, moving beyond the aspect of a mere art and transparency. This assignment has aimed to awaken an insight within the students into basics of Chinese and international glass art as they reconstruct this knowledge of working on glass, experimenting how the material behave, while simultaneously receiving practical exposure to glass, how it can be processed and worked with, as well as applying computational methods to get contemporary and speculative results. This module has also received assistance and help on teaching from the Institute for Lightweight Structures and Conceptual Design (ILEK) at Stuttgart University.

Acknowledgements

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