THE INVERSE RELATION BETWEEN SCAFFOLDING AND COMPLEXITY IN DESIGN EDUCATION

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Abstract

This paper aims to discuss the framework of scaffolding theory within a design studio environment carried out at Virginia Commonwealth University in Qatar, an American institution embedded in the Gulf region. The research question is: “How do we turn good students into good designers? In other words, “How to transform students into colleagues while already in an academic environment?”

Previously we have developed a body of research on upper design studios. In this research, we pull back the pedagogical scaffolding making way for increased complexity in order to foster critical practitioners ready for a life outside school. This transitional process is, of course, important in any design environment; however, it is crucial in the emerging design environment of Qatar. Despite efforts in every level of the education, we still found a deficiency in some core of design skills, such as: critical thinking, problem solving, and self-motivation in the senior student body. This inherent problem stems from a local high school system that somewhat lacks emphasis on these skills. To make matters worse the “Piecemeal” system of an American school does not automatically provide a clear synthesizing of knowledge. Courses have a tendency to operate as random silos with minimal to no connections. In this setup, didactic outcome becomes more of an added complicatedness rather than complexity.

The pedagogical experience from upper design studio led us to reform how we approach the earlier formative studios. In this particular studio, Sophomore second semester, we worked to break the silos and promote students to synthesize an increased complexity as well as balance their schedule. This was done in a three-pronged approach:

− Bring the technical classes into the design studio,
− A hands-on approach to problem solving, and
− A cyclical revisit to the same object.

The technical courses – materials and AutoCAD usually taught as disparate units was amalgamated with the studio class. Knowledge gained in the technical classes was logically transferable into the studio project. Gradual complexity was achieved through successive gains of technical proficiencies. In combination, the students explore these applications through a hands-on phenomenological approach. This technique promotes a multisensory approach to problem solving and a direct path into critical thinking through trial and error. These two approaches were then applied on the same architectural space i.e. we return cyclically to the same architectural object with added and increased complexity. The challenge was to create a roadmap that progressively provided less scaffolding over time. Starting with a relatively small and simple object with added layers over time that paved the way for a deeper complexity less complicatedness.

This multifaceted approach was supported by the introduction of learning techniques such as: self-studies in groups, seminars, workshops, and student-made tutorials. As the project developed, the role of the teacher changed from a classical instructor to a more pulled-back role of an older colleague. Although our findings are site specific we believe the outcome is applicable in other academic environments.

Keywords: Complexity, Complicatedness, Design Education, Educational Silos, Pedagogical Scaffolding.

1 INTRODUCTION

Previously we developed a body of research on upper design studios in Interior Design at VCUQatar¹. The main questions has been: “How do we turn good students into good designers? In other words, “How to transform students into colleagues while already in an academic environment?” In this
research, we discovered that the students (program) grappled with three major interrelated challenges:

- Complexity tends to become complicatedness; students show difficulties when given complex problems without a clear solution.
- Knowledge tends to be siloed; the program builds on a piecemeal curriculum where specific classes give specific tools and proficiencies independently.
- Deficiencies of critical thinking, problem-solving, and self-motivation within the student body.

These challenges stem from the configuration and context of the program. In the configuration of the program, we find factors of curriculum, schedule, and facilities. In the context we find factors such as prior education, local alumni, and studio culture.

The findings from ‘Choice Studio’ (Senior Studio Fall 2012) show how: the students grapple with freedom of complexities, when educational scaffolding, and prescriptive instructions are removed. These findings are further collaborated by discoveries from other senior studios. Our students show difficulties dealing with complex and wicked problems. The complexity of the interior design program can be illustrated by the rich body of Student Learning Expectations required by Council for Interior Design Accreditation (CIDA). To pass an accreditation CIDA has defined sixteen standards. “To be accredited, a program must comply or partially comply with all sixteen standards.” The standards are further broken down to 91 Student Learning Expectations. Given that the Interior Design at VCUQatar is a three year program specific courses become heavily loaded with Student Learning Expectations. The three courses in question in this paper (Introductory Design Studio II, Interior Materials & Textiles, and Interior Graphics II) amount for a total 47 Student Learning Expectations.

Solving design problems, especially wicked problems, involves a certain amount of unknown variables, risk taking, analytical ability, problem definition and critical thinking. We have formed some educated guesses to why our students find this challenging. To start with it is, after all, a bachelor level of education and to deal with an increasing complexity is a maturity one acquires as a designer over a long period of time. Second, there is little focus on problem-solving skills in the local high school system. Third, the young nation of Qatar is just in progress to create a culture around design practice. Fourth, the “Piecemeal” system of an American school does not automatically provide a clear synthesizing of knowledge. Courses have a tendency to operate as random silos with minimal to no connections. The system of VCU tends to silo knowledge into isolated learning/instruction subjects. Instructors for each subject organize their teaching with none-to-little consideration for other subjects. Each course negotiates the program’s overarching curriculum from their topic’s perspective in respect of what to cover, depth of coverage, sequence, timing, and deadlines. Students’ timetable is characterized with separate slots for each course name, time, location, and instructor independently. Subjects are regarded as entities in of themselves.

2 METHODOLOGY

When we had a chance to reform a big section of the curriculum at the sophomore level we were thus guided by the pedagogical experience from upper design studios. The changes to the curriculum came to be called the Meta Studio. This Meta Studio was an amalgamation of the three classes: Introductory Design Studio II, Interior Materials & Textiles, and Interior Graphics II. Consequently, the Meta Studio intended to provide a didactic structure that breaks down siloes between subjects. In addition to this primary objective the Meta Studio was to create a sequencing of instruction that initially built a solid pedagogical scaffolding and thereafter successively pulls away the scaffolding. This breaking down of siloes and pulling back of scaffolding happened through the operations of: coordinating classes; and creating a Meta Team. In order to coordinate the three courses the first action was to establish preliminary schedule and course matrix. Herein the authors juggled an array of issues such as: sequencing of tools and skill building activities; coordination of themes and topics; and synchronisation of activities, lectures, and hand-ins. The so-called Meta Team consisted of: the three course instructors plus the extended support system from the university such as representatives from the Library, the Writing Center, and the Wood shop. These two operations are interrelated; however this paper is focusing on the first: the coordination of classes.
Coordinating three classes was designed in an approach to bring the technical classes (Interior Materials & Textiles, and Interior Graphics II) into application through execution in the Introductory Design Studio II. Thereby the students were able to combine a theoretical scaffolding with a hands-on approach to problem solving; i.e. knowledge acquired from readings, lectures, seminars, and demonstrations was applied to solve real life design problems. Throughout the semester, students returned to execute three different designs (A folly/pavilion in a park, a resident for an elderly female, and an office for a NGO) in the same base building, a space with the measurement of 7.2 x 7.2 x 5 meters. Thus, the students cyclically revisited the same object, each time with a different design program, each time with an added complexity, and each time with a little less scaffolding provided by faculty. The first cycle (Making I, “A Walk in the Light”) dealt with aspects of building structure, movements of the body in space, and the importance of light and shadows for wellbeing. The second cycle (Making III “Granny Ville”) focused on aspects of the one user in a space, private & public, functionality, and psychology. This cycle also brought the attention to building codes and regulations, such as egress and the American Disability Act. The second cycle also contained a precedent study (Making II A Precedent Exhibit – Iconic House Analysis) where the student developed tools such as: analytical spatial diagram, material-, site- and context-analysis, and model making.

The third cycle (Making IV, Global Local Ageing Offices) dealt with sociological complexity, the ability to juggle a larger program within a complex space plan. In this cycle, we also introduced students to wicked problem-solving when the brief intentionally was ill-defined; communication between instructors and students was verbal; and the ‘clients’ were unaware of some challenges. The instructors played the role as clients representing different NGOs. In briefing the students these factious clients showed some unfounded high expectations regarding, size of functions and spaces; i.e. as in some real-life situation the clients had low understanding of what functions really fit into a space. A bit like when you want a new Merce des but your economy only covers a used Volkswagen. The students worked and were assessed individually but were paired up. Each pair of students was given the space of four base building units linked together in a row (in total a space of 7.2 x 28.8 x 5 meter) The middle two units of the space were shared spaces (here the pair of students had to negotiate and collaborate). The two units in the end were designated to each student. Furthermore, both students in the pair were given a slightly different brief. One brief catering for an international NGO and the other catered to the local counterpart. Thus, this cycle was a test for how the strategy of: lessen the scaffolding while increasing the complexity was working. Could the student deal with The Inverse Relation Between Scaffolding and Complexity. However, before we discuss the outcomes of the Meta Studio let us linger a bit around the strategy of how we brought the three courses together – the strategy of dealing with a fractured weekly schedule and providing for the total of 47 Student Learning Expectations.

Previous to the Meta Studio the structure of, and attitude toward the three classes in question followed a traditional American model. This was not only apparent in how they were operating as silos but, how the overall hierarchy was perceived. The last aspect is often implicitly understood. The Design Studio is an integral part in almost all design and architectural educations. The Studio experience often aims to emulate the practice of design, as far as process of: ideation and execution. The pedagogy of a Design Studio is thus often thought of “learning by doing”. On the other hand, supporting classes such as the Graphics and Materials class generally deals with knowledge accumulation in a different lecture-based manner. These courses are designed to address theoretical and technical precepts in a generic manner. In order to fit a fragmented schedule, knowledge is typically broken down to specific modules. Thus, these classes are often taught piecemeal where modules are introduced without any regards to a holistic sequencing; i.e. the student might not have an idea why they learn a specific topic or the relationship between different topics. It is not surprising that Design Studio is considered the most prestigious class to teach. It is also the class that most schools would exhibit in the end of the year show. Consequently, attempts to break down the silo structure often begins with an already set Design Studio regarding schedule and projects and supporting classes are then “asked” to “plug-in” what they can contribute.

In contrast, we started forming the Meta Studio by flattening the hieratic structure; i.e. all the 47 Student Learning Expectations were treated equally, and initiated the sequencing with building proficiencies and skills in the technical classes first. The Design Studio thus was a receptacle where complexity was synthesized within a hands-on application of a real-life project. Knowledge gained in the technical classes was thus not only logically transferable into, but seen as generators of the studio projects. Gradual complexity then is achieved through successive gain of technical proficiencies that are given an outcome. This technique promotes a multisensory approach to problem solving and a direct path into critical thinking through trial and error. The challenge was to create a roadmap that
progressively provided less scaffolding over time. This multifaceted approach is supported by the introduction of learning techniques such as: self-studies in groups, seminars, workshops, and student-made tutorials. As the project developed, the role of the teacher changed from a classical instructor to a more pulled-back role of an older colleague.

3 RESULTS

The Meta Studio was concluded in late April this year, and we intend to do more research; however, we can already draw some conclusions from the outcomes. When we evaluate the Student Outcomes, we fall back to some reoccurring end of the year assessments such as: student reviews; fulfillment of deadlines and grading criteria; and the Sophomore Portfolio Review. Furthermore, we have collected testimonials from external guest critics and members from the Meta Team. As communicated above concerning fulfillment of deadlines and grading, we found a higher level of compliance than previous years. The Sophomore Portfolio Review also assessed the outcomes unanimously: beyond expectations. This sentiment was echoed in the feedback from the external critiques and members of the Meta Team. the Meta Team has attested to a higher proficiency in writing, usage of library, the woodshop and FabLab.

4 CONCLUSIONS

We start to answer the question: how did the group of students that partook in the Meta Studio tackle the ill-defined, complex and fuzzy brief of the last cycle? The answer is: the students performed well over expectations in the last cycle (Make IV). All students were able to, within deadline and expectations, produce final projects that well met the expectations. There was strong evidence of sufficient compliance with most of the required 47 Student Learning Expectations. In the experiment with ‘Choice Studio’ “… the pedagogical shift towards freedom and guided discovery was a limited success with stronger students performing better and weaker students doing worse”. The outcome of the Meta Studio saw both stronger and weaker students perform better. We found that the structure of the Meta Studio indeed had broken up the traditional didactic silos; helped students develop synthesizing skills to an increased level of complexity; and filter a larger and more diverse input of views and knowledge into the classroom. In short, the freedom of complexities did not seem to fright the students or cripple them.

Furthermore, the synchronized sequencing of deadlines gave clear breaks and definite breathing space for the students. Of course, individual students still grapple with how to manage their time and find a balance in meeting deadlines and managing stress levels. However, we did not detect a massive collective burnout within the group. This differs from experiences of previous years’ sophomore classes which have shown more defined periods of low energy.

Within the Educational System & Curriculum Expectations we detected a positive result in that the Meta Studio generated: a more active combinatory process, both from a teacher, and student perspective; achieving emergent learning with a larger capacity for synthesis, critical thinking and problem-solving. It also prevented the complicatedness that comes from siloed thinking. Understanding of complexity emerges through: the synergetic overlap of topics applied in all three classes. Furthermore, we saw more independent students in the final stages.

From the perspective of the professors we found that the structure within the Meta Studio demands a higher level of real-time calibration, flexibility, and adaptability of the individual activities within the week. This is necessary to addressing learning deficiencies where and when they are detected. The strategy, therefore, demands adaptability and a willingness to quickly customize: lectures, demonstrations and workshops.

We intend to further do research and follow up this group of students as they progress through their education. However as stated above we have already seen some very positive tendencies within this body of students that makes us believe that they are going to be good designers. We further believe that the holistic view we were able to provide through the Meta Studio is in many ways core to the very discipline of design.
REFERENCES


[2] Ibid.


