

THE DESK CRITIQUE: ASSESSING THE ROLE OF TEACHING STYLES IN THE COGNITIVE DEVELOPMENT OF STUDENTS

KLONDIKE, TRAVIS

North Carolina State University, tmklondi@ncsu.edu

1 ABSTRACT

Desk critiques, the term that refers to the ongoing conversations between teachers and students in design studios, has been the lifeblood of design education for centuries. In a typical five-year design-based degree, it can be expected that a student will partake in well over 300 desk critiques, often lasting 15-30 minutes each. However, despite the significant role that desk critiques play in the education of design students, instructors often enter academia without any training as to how their own style of teaching can promote or hinder the cognitive development that is necessary for a student to progress as a designer.

This study takes a mixed-methods approach that aims to better understand the influence of teaching styles on the cognitive development of students, as they were observed in a semester-long graduate-level landscape architecture studio. Modeled after various studies conducted by Professor William Perry, analysis of pre- and post-test interviews determined the cognitive state of each student in relation to a nine-point positional framework (Perry, 1970). Throughout the duration of the semester, desk critiques were audio-recorded and subjected to a content analysis through a categorical coding scheme of the verbalizations (Goldschmidt, Hochman & Dafni, 2009). In doing so, this study was able to identify teaching styles of the faculty, and then overlay this information with the pre- and post-semester cognitive evaluations of each student. Results point to trends that link typologies of teaching styles in desk critiques with observed changes in the students' cognitive state over the course of the semester.

1.1 Keywords

desk critique; design studio; cognitive development; pedagogy; teaching style

2 INTRODUCTION

It can be said that for nearly two centuries the pedagogical approach to design education has remained relatively stagnant. Launched at the Ecole des Beaux Arts in France in the early 1800s, the studio-based learning model is recognized as the first formal architectural education framework. Although this was in many ways only a slight pivot from the medieval apprenticeship method, the Beaux Arts move to a studio system nonetheless laid the foundation for the design curricula of today (Salama, 1995). Since that time, there have been a number of pedagogical movements that have altered the content and dynamic of the studio environment, but the inherent makeup of the framework has remained the same.

Fast-forward to today's studio, and one would observe a workspace comprised of students that work toward a series of both individually-led and group projects over the course of one semester. Typically meeting two or three times a week for a number of hours each, studio sessions are centrally focused around students engaging in discussions with teachers and other students about the current state of their designs (Goldschmidt, Hochman & Dafni, 2009). These discussions are of particular interest for this study.

Formally called "desk critiques," these describe, in the academic sense, the process by which a person of higher authority (i.e. teacher) and a person of lower authority (i.e. student) take part in the repeated proposition and critique of constantly evolving, never complete, design solutions (Brocato, 2009). When engaged in these conversations, the teacher must strike a delicate balance between providing instruction and enabling a student's free will – with each individual, often for 15-30 minutes at a time – in order for them to be effective.

The sheer time commitment and one-on-one nature of desk critiques allows for a unique bond to form between the student and teacher. In a typical five-year design-based degree, it can be expected that a student will partake in well over 300 desk critiques. However, despite the significant role that desk critiques play in the education of design students, instructors often enter the teaching realm without any training in education or learning theory (Hargrove, 2007), and the published work specifically relating to the studio setting and desk critiques is painfully limited (Goldschmidt, Hochman & Dafni, 2009). Responding to these shortcomings, it seems that there is not only a need to better analyze desk critiques, but also to establish a way of evaluating the effectiveness of them for the student.

3 THEORETICAL FRAMEWORK

3.1 Perry Developmental Scheme

In the 1950s, William Perry – then professor at Harvard – began exploring the causal roots of cognitive and moral development in college students. Through a series of open-ended interviews, Perry immersed himself in a longitudinal study that asked hundreds of students to describe their college experiences at the end of each academic year. Expecting to observe a variety of personality traits, Perry conducted a pilot study with students from Harvard and Radcliffe. However, it quickly became apparent that instead of digging up different personalities, Perry was actually unearthing a rather consistent outline of the students' educational journey (Perry, 1970).

After nearly a decade of interviews, Perry and his colleagues generated a model that reflected their findings – a nine-point positional framework that mirrored the ever-evolving perspective of a college student – describing a succession that moves from early expressions of *dualism* (simple, dichotomous views of knowledge, Knefelkamp and Slepitzka, 1976), to gradual adoption of *multiplicity* and *relativism* (acceptance of a vast community of different possibilities, Knefelkamp and Slepitzka, 1976), to positions of *commitment* (affirmation of one's self or identity, Moore, 2001).

While the Perry scheme has drawn some scrutiny for gender and cultural differences that the study failed to taken into account, it is still widely recognized for its ability to connect students' philosophical outlooks with their attitudes toward the educational environment (Moore, 2001) – in the case of this study, the way in which students cognitively develop within the studio environment.

3.2 Self-Determination Theory

In come psychologists Edward Deci and Richard Ryan. In 1985 the duo developed a meta-concept for the study of human motivation which they coined "self-determination theory" (SDT). Their proposed model stipulates that there are varying degrees of motivational drivers for any given situation. Deci and Ryan were on the front-end of those proposing that motivation is *not* a unitary construct (Deci & Ryan, 1985). Rather than depicting motivation as either 'you have lots of it, or none of it,' they were of the belief that a spectrum model was more fitting - ranging from highly external factors (deadlines, salaries, grades) to highly internal factors

(engaging in an activity because it is found to be fundamentally interesting). This model has been widely tested, and while some slight variations to the initial proposal exist, one of the most significant concepts that the model holds at its core is the idea that all motivation comes from three sources: *competence* (levels of confidence associated with goals and knowledge, Ryan & Deci, 2000), *relatedness* (desire to feel connected within a larger community, Baumeister & Leary, 1995), and *autonomy* (to align behavior in accordance with one's sense of self, deCharms, 1968).

When dealing with desk critiques, it is the prerogative of the teacher to find just the right balance of these three elements - competence, relatedness, and autonomy – to best promote students' learning. Furthermore, prescribing these motivational pillars in such a way that promotes the cognitive development of each individual student should be embedded within the modus operandi of *all* design educators. Despite the frameworks for SDT and Perry's scheme being constructed independent from one another, the areas of overlap as they relate to design pedagogy are unmistakably present. It is the goal of this study to find the relationship between these two theories as they manifest themselves through the desk critique.

4 PRECEDENT RESEARCH

While there is a wide body of work that has looked separately at the factions of SDT and Perry's scheme, there isn't much work explicitly detailing how the two can work in concert with one another - and research delving into how these concern the effectiveness of a desk critique is all but absent. There is most certainly a need for this type of research, as it is more or less just the next logical step in a building chain of pedagogical philosophies.

4.1 Dinham (1987): An Ongoing Qualitative Study of Architecture Studio Teaching: Analyzing Teacher-Student Exchanges

After observing architecture studio courses conducted at four different universities in the U.S., Dinham made particular notice of the "teacher-student exchanges" known as desk critiques. Dinham notes that desk critiques could be condensed into eight categories of teaching: philosophies / views manifest in teaching, ideas about teaching and learning, student preparation, time, teachers' response to students, two-way communication, student talk, and teacher guidance based on student work. Dinham provides greater specificity by noting that further interpretation is needed from the "theoretical perspectives of cognitive psychology and adult cognitive development" in order to grasp a better understanding of the collective variables relating to desk critiques.

4.2 Salama & Wilkinson (2007): Design Studio Pedagogy: Horizons for the Future

Adding another layer of detail, Salama and Wilkinson articulate the necessity to address "cognitive styles" in studio pedagogy – stating that design instructors need to "find ways in which knowledge and its applications are integrated in a learning setting that match students' abilities." Said in terms of this study, it becomes evident that teachers need to possess the ability to customize their teaching styles and motivational cues used during desk critiques, in order to promote the cognitive development of each individual student. However, up to this point, a way in which to appropriately measure and analyze this had not yet been conceived.

4.3 Goldschmidt, Hochman & Dafni (2009): The Design Studio "Crit": Teacher-Student Communication

That is, until Goldschmidt, Hochman & Dafni entered the arena. Placing the genetic makeup of desk critiques under a microscope, this trio conducted a study that aimed to investigate teachers' performance in the studio environment. Specifically, they looked into instructors': teaching profile, management of critiques, priorities, and responsiveness to students' concerns - through a series of observed desk critiques. While this was not the first case of examining these teacher-student exchanges, it was however, the first to introduce a quantitative measure into the analysis of them. After reviewing the collected data, Goldschmidt and her colleagues were able to formulate an eight-category coding scheme for the teachers' language structure used during desk critiques.

Categories consisting of: 1. *Report / review / analysis of the state of the design*, 2. *Clarification questions*, 3. *Proposals for change / improvement*, 4. *Reference to design precedents / examples*, 5. *Explication of design issues, theories / principles / norms / conventions*, 6. *Statements regarding design methodology / presentation*, 7. *Praise, expression of satisfaction, encouragement*, and 8. *Questioning, pointing out mistakes / shortcomings, expressions of dissatisfaction*, were all used to code the teachers' side

of desk critiques. This was a monumental step forward in creating a better understanding of the teaching styles present in the studio environment – and it is from here, where this study takes flight.

5 RESEARCH QUESTIONS

While the work of Goldschmidt and her colleagues created a way to analyze different teaching styles present during desk critiques, it did not evaluate them in terms of a students' cognitive development – which, in much of the precedent work, seems to be an integral piece to the equation. By overlaying the coding scheme presented by Goldschmidt and her colleagues with broader theories of SDT, and then adding a form of cognitive assessment (similar to the methods used in the original Perry study), it then becomes possible to shed light on the following questions:

1. *Can the cognitive positioning of design students enrolled in the same studio course change over the course of one semester?*
2. *Are there other influencers, aside from desk critiques, that can affect the cognitive development of design students?*
3. *Do teachers express tendencies in teaching styles relative to the motivational pillars of SDT (competence, relatedness, autonomy)?*
4. *If tendencies in teaching styles exist, how do these styles correlate with the cognitive development of all students, cohorts of students at particular cognitive positions, or none of the students?*

6 METHODOLOGY

6.1 Framework

In recognizing these research questions, this study used a diagnostic approach to better understand the breadth of influence that desk critiques have on a design students' cognitive development. Rather than precisely measuring and controlling for the vast number of potential variables that can affect a students' cognitive development, this study took a more holistic view that attempted to offer insight into the structure and dynamics of a specific element in a design students' educational experience: the desk critique. In order to achieve this, the data collection for this study was concerned with pre- and post-test cognitive assessments of students, as well as motivational techniques used in teaching styles coded from the language used by teachers during desk critiques.

A graduate-level introductory landscape architecture design studio housed within the College of Design at North Carolina State University served as the study sample due to its studio-based education system and willingness to participate for one semester. The students enrolled in this course came from a variety of educational backgrounds, and for many was their first exposure to a landscape architecture specific studio. Eighteen students were enrolled in this course, and there were two teachers that co-taught the class. In order to collect a useful data pool, this study utilized a mixed methods approach broken into four parts:

1. *Pre-Test Questionnaire:* On the first class of the semester, students were provided with the *Learning Environment Preferences (LEP)* questionnaire. This is an objective, recognition-task instrument developed by researchers at the Center for the Study of Intellectual Development (CSID) and is directly drawn from the Perry position rating criteria. The questionnaire consists of 65 Likert-scale type questions that ask students to rate and rank their ideal learning environment (Moore, 1987). Students were provided with this questionnaire so that they could engage in self-reflection of their own learning preferences, and also become familiar with some of the terminology prior to the pre-test interview.
2. *Pre-Test Interview:* During the first week of the semester, students were asked to participate in a one-on-one focused interview, each of which lasted approximately 15-20 minutes. These video-recorded sessions allowed students to further elaborate on their responses to the LEP. Initial questions posed by the interviewer derived from the five primary categories of questions found in the LEP, and the interviewer probed when necessary in order to elucidate more material from the respondent. The initial questions were asked in the following order:

“In your ideal learning environment...”

- a) *“what type of course content would you prefer to be covered?”*
- b) *“what would be the role of the teacher?”*
- c) *“what would be the role of other students?”*
- d) *“what type of classroom atmosphere would you prefer?”*
- e) *“what type of evaluation process would you prefer?”*

3. *Audio-Recorded Desk Critiques:* After all pre-test interviews were complete, audio recordings of desk critiques were able to begin. Teachers were asked to record all desk critiques, for all students, throughout the entire semester using an audio-recording device that the teacher placed on each students' desk at the time of the critique. At the end of each studio session, the teachers handed over the audio-recording devices to the researcher in order to transfer the data.

4. *Post-Test Interview:* During the last week of the semester, students participated in a second one-on-one focused interview, each of which lasted approximately 15-20 minutes. These video-recorded sessions asked students the same initial questions as posed in the first interview, and follow-up questions asked student to reflect on their perceived changes or reaffirmation of beliefs from the start of the semester.

6.2 Strategies for Analysis

While all students in the class were asked to participate, the analysis phase of this study excluded four of the eighteen students for two reasons: lack of participation in either the pre- or post-test interview, or clear inability to articulate beliefs due to language barriers. Inclusion of such students would create potential scenarios where incomplete data would have been used, or where the diction used by the students in *describing* their cognitive state may generate a rating not reflective of their *actual* cognitive state – thus skewing the validity of the results.

After the completion of the pre-test questionnaire and pre-test interview phases, video recordings of the interviews were given to a panel of two judges for further examination. The judges were then asked to consider the presented material for each student, and then agree on a consensus 1-9 score that is representative of each students' current position in the Perry scheme. Prior to viewing the videos, both judges were familiar with the Perry scheme and individually reviewed the model in detail. A condensed summation of each position in the Perry scheme was also provided to the judges to serve as a rubric during examination of the video content.

Although the judges assigned pre-test scores to each student during the same semester the study took place, neither the studio teachers, nor the students were informed of the scores, and neither were aware that a cohort of four students had been excluded from the study. In order to control for bias and classroom rifts, everyone enrolled in the course was of the assumption that all data would be used.

Using the coding scheme developed by Goldschmidt and colleagues (2009), the desk critiques from the cohort of the fourteen selected students were categorized accordingly. However, a necessary modification to this system was added for the purpose of this study: the eight categories used for coding the desk critiques were allocated into groups under the umbrella of SDT, based on the motivational tendencies of each. Using the premise that all comments from teachers occurring during desk critiques are some form of motivation, the three pillars of SDT encompassed the eight categories of the Goldschmidt coding scheme within them:

1. *Competence: Report / review / analysis of the state of the design, Clarification questions, Reference to design precedents / examples, and Explication of design issues, theories / principles / norms / conventions*
2. *Relatedness: Praise, expression of satisfaction, encouragement, and Questioning, pointing out mistakes / shortcomings, expressions of dissatisfaction*
3. *Autonomy: Proposals for change / improvement, and Statements regarding design methodology / presentation*

By grouping the coding scheme in this way, it allowed for another layer of information to be identified in the observed teaching styles. Are the teachers providing the students with feelings of competence or lack of competence? Relatedness or lack of relatedness? Autonomy or lack of autonomy? As an example, one can imagine a teacher prompting a proposal for change / improvement in two very different ways: “What if you were to re-consider the location of this wall – how would that alter the functionality of this space?” or “You need to

move this wall here or else this space won't function correctly." Both comments would fall under the same category in the Goldschmidt coding scheme, however, the presence of autonomy is starkly different.

Upon reaching the end of the semester, the same judges that evaluated the pre-test interviews reconvened to score the post-test interviews. Again, the judges were asked to agree on a consensus 1-9 score for each student that was representative of the students' current position in the Perry scheme.

Table 1. Pre- and post-test scores of cognitive positioning based on consensus ratings.

	Student Pre-Test Score	Student Post-Test Score	Change in Score
<i>Student C</i>	9	8	-1
<i>Student O</i>	7	6	-1
<i>Student E</i>	7	5	-2
<i>Student G</i>	7	5	-2
<i>Student I</i>	5	4	-1

<i>Student H</i>	5	6	+1
<i>Student A</i>	5	7	+2
<i>Student P</i>	4	6	+2
<i>Student M</i>	4	6	+2
<i>Student D</i>	4	5	+1
<i>Student K</i>	4	4	0
<i>Student L</i>	4	4	0
<i>Student F</i>	3	5	+2
<i>Student J</i>	2	3	+1

At this point, there were pre- and post-test ratings for each student that signified their cognitive position relative to Perry's scheme at the beginning and end of the semester - and there were coded desk critiques revealing the teaching styles used by the teachers throughout the semester. While this study does not attempt to draw conclusive causal links between motivational typologies and cognitive development, it is the hope that the correlations presented in the results will encourage similar studies of larger sample sizes to take place.

7 RESULTS

7.1 Change in Cognitive Positioning: Pre- and Post-Test Scores

Analysis of the pre- and post-test scores reveals that the fourteen students included in the study represented a wide range of cognitive positions on the Perry spectrum. The lowest pre-test score being a 2, and the highest being a 9, with almost every degree of the scheme represented. The average pre-test score amongst the students was a 5.0, and 4 was the most common pre-test score. Most intriguing about the results of the pre- and post-test ratings, however, is that a clear division exists in the net change of cognitive position scores between the highest-rated cohort of pre-test scores and the rest of the study sample. As seen in Table 1, a regression of scores for those with a pre-test rating of 7 or higher, seems to coincide with an advancement of scores for those with a pre-test rating of 5 or lower.

7.2 Other Influencers: Student Pairings

Equally deserving of attention is the cognitive movement of individual students within pairings that represented class partnerships throughout the majority of the semester. Unbeknownst to the researchers while developing the methodology for this study, was the intent of the two teachers leading the instruction of this course to propose a series of projects throughout the semester that would, in large part, require the students to work in pairs. Starting in early October and lasting until the end of the semester, the students worked on projects with the same partner. Coupling the results of the pre- and post-test cognitive positioning scores of the students to match these partnerships, as seen in Table 2, shows that a correlation exists between the two students within each pair. In every instance except for one, the student with the higher pre-test score regressed in their post-test score, while the inverse occurred for the student with the lower pre-test rating. The group that did not follow this trend saw both students stagnate in their pre- and post-test scores, with a net change of zero. In short, it appears that the two students are seemingly meeting-in-the-middle within these pairings, in terms of their individual cognitive positioning.

Table 2. Group pairings with pre- and post-test scores of cognitive positioning based on consensus ratings.

		Student Pre-Test Score	Student Post-Test Score	Change in Score
Group 1	Student A	5	7	+2
	Student B	N/A	N/A	N/A
Group 2	Student C	9	8	-1
	Student D	4	5	+1
Group 3	Student E	7	5	-2
	Student F	3	5	+2
Group 4	Student G	7	5	-2
	Student H	5	6	+1
Group 5	Student I	5	4	-1
	Student J	2	3	+1
Group 6	Student K	4	4	0
	Student L	4	4	0
Group 7	Student M	4	6	+2
	Student N	N/A	N/A	N/A
Group 8	Student O	7	6	-1
	Student P	5	6	+1
Group 9	Student Q	N/A	N/A	N/A
	Student R	N/A	N/A	N/A

7.3 Tendencies in Teaching Styles: Coded Desk Critiques

While audio-recording devices were utilized by teachers throughout the semester on a consistent basis, there were some days that did not require use the devices because of: field trips, classes with a lecture/open discussion focus, and classes that only included audio recordings of some but not all of the students. The four days of audio recordings selected for analysis include: one day of recordings prior to the students being put in the previously-discussed pairings, and three days of recordings within those pairings. Each of the four days included desk critiques with every student enrolled in the course, and included discourse with both teachers giving desk critiques to each pair of students together.

In general, the desk critiques seemed to take on a similar coded pattern. Initial questions or statements of competency regarding the state of the students' design would set the stage at the beginning of most critiques. Whereas a steady diet of autonomy-related dialogue of proposals for change / improvement would constitute the end of most critiques. The middle third of critiques largely consisted of back-and-forth feedback that would zig-zag across the categories of: competency, relatedness, and autonomy, however this varied with each critique.

Table 3. Portion of a coded desk critique with depiction of non-autonomous cluster.

		Competency				Relatedness		Autonomy	
		1	2	3	4	5	6	7	8
Move #	73								
	74								
	75								
	76								
	77								
	78								
	79								
	80								
	81								
	82								
	83								
	84								
	85								
	86								
	87								
	88								
89									
90									
91									

KEY:

1. Report / Review / Analysis of the state of the design
2. Clarification questions
3. Reference to design precedents / examples
4. Explication of design issues using theories / principles / norms
5. Praise / Expression of satisfaction
6. Dissatisfaction / Pointing out mistakes
7. Proposals for change / improvement
8. Statements regarding design methods / presentation

Autonomous proposal / statement
 Non-autonomous proposal / statement
 Non-autonomous cluster

What became most clear after listening to the language in the critiques, was the difference between autonomous and non-autonomous instruction in the word choice used by the teachers. Specifically, looking at

the phrases that fell into the categories: *proposals for change / improvement, and statements regarding design methodology / presentation*, and assessing each phrase for its inherent sense of autonomy, or lack thereof, on a binary basis. Proposals and statements that: *issued a general direction or way of thinking, allowed students to pursue a requested direction, or referenced a teachers' drawing as an example of process*, would all be coded as autonomous. Example:

Teacher: "If the goal of the green space is to host a wide range of activities... then you might want to re-visit how the arrangement of your programmed areas contributes to that idea."

Proposals and statements that: *issued a specific direction or way of thinking, deterred students from pursuing a requested direction, or referenced a teachers' drawing as the accepted direction*, would all be coded as non-autonomous. Example:

Teacher (while drawing on plan): "If you moved the parking over here and oriented it like this, that would allow you to have a much more open green space in the middle here."

Dissecting critiques in this format begins to peel back some of the subjectivity typically associated with autonomy, and contends that this type of instruction is either pointing to a directed product or a guided process. Does the comment draw a straight line from point A to point B? Or does it leave the door open for a self-discovered response? Table 3 illustrates what an excerpt of one critique looks like after comments from the teacher have been fully coded.

7.4 Tendencies in Teaching Styles: Correlation with Cognitive Growth

Table 3 also demonstrates an example of a non-autonomous grouping of phrases referred to as a *non-autonomous cluster*. These clusters illustrate instances where the teacher would use non-autonomous directives either back-to-back or only separated by one phrase. Clusters varied in length, ranging from two comments in a string of phrases all the way to twelve, and occurred more frequently in some critiques than others. Tracking the frequency, length, and percentage of non-autonomous phrases / clusters within the autonomy category revealed relatively consistent trends across the study. Students that belonged to the most common, average cohort of pre-test cognitive ratings (those with scores of 4 or 5, n=8), appeared to elicit post-test cognitive position ratings directly correlated with the amount non-autonomous instruction they received. The results can be seen in Table 4, which highlights all of the students that represent the cognitive average amongst pre-test scores. Although the sample size is small, the data draws attention to a breaking point where too much non-autonomous instruction tends to hinder the cognitive development of the average cohort of cognitive pre-test positions. Additionally, though not as consistent of a trend, greater frequencies and average lengths of non-autonomous clusters seem to coincide with greater percentages of non-autonomous instruction as well.

8 DISCUSSION

8.1 Potential Explanations for the General Advancement of the Average and Lowest-Rated Pre-Test Scores

The cognitive advancement of students with pre-test scores of 5 or lower signifies a rather cohesive acceptance from these students of the teaching styles and / or group pairings posed by the teachers of this studio. Though there are many external factors that may influence the advancement of these students, this study assumes that the discourse during desk critiques and in paired settings are significant contributors to the cognitive development of design students. According to the Perry scheme, students with these ratings are said to fall under either the *dualism* or the *multiplicity / relativism* positions of cognitive development. Students in these positions are said to be either concerned with obtaining knowledge, skill sets, and facts, or looking for an environment that informs them of an array of possible outcomes and processes - and interpretation beyond that is the prerogative of the individual. Considering these descriptions to be true, it should not be a surprise that the amount of non-autonomous feedback was amongst the highest proportions for groups including students with the lowest-rated pre-test scores.

Table 4. Change in student cognitive positioning in relation to the amount of non-autonomous instruction received.

	Total # of Moves from Group Critiques	% of Total Moves in Autonomy Category	% of Autonomy Category Moves with Non-Autonomous Coding	# of Non-Autonomous Clusters	Average # of Moves per Non-Autonomous Cluster	Student: Pre-Test Scores / Post-Test Scores & (Change in Scores)
<i>Group 7</i>	238	29.8%	52.1%	10	2.8	Student M: 4 / 6 (+2) Student N: N/A (N/A)
<i>Group 8</i>	207	27.1%	53.6%	7	2.6	Student O: 7 / 6 (-1) Student P: 4 / 6 (+2)
<i>Group 4</i>	203	26.6%	53.7%	10	3.1	Student G: 7 / 5 (+2) Student H: 5 / 6 (+1)
<i>Group 1</i>	229	24.9%	57.9%	8	3.0	Student A: 5 / 7 (+2) Student B: N/A (N/A)
<i>Group 2</i>	230	33.9%	64.1%	13	3.5	Student C: 9 / 8 (-1) Student D: 4 / 5 (+1)
<i>Group 3</i>	264	25.4%	68.7%	12	4.3	Student E: 7 / 5 (-2) Student F: 3 / 5 (+2)
<i>Group 5</i>	167	33.5%	71.4%	11	3.5	Student I: 5 / 4 (-1) Student J: 2 / 3 (+1)
<i>Group 6</i>	238	25.2%	88.3%	15	3.3	Student K: 4 / 4 (0) Student L: 4 / 4 (0)
<i>Group 9</i>	N/A	N/A	N/A	N/A	N/A	Student Q: N/A (N/A) Student R: N/A (N/A)

The amount of directed instruction they were receiving was likely feeding the exact mechanism they were comfortable operating. Perhaps the teachers were providing just enough autonomy to nudge them into

higher post-test scores, or perhaps the amount of responsibility and free-will they were immersed with in the pairings was enough to push these students higher.

Conversely, the students with pre-test scores amongst the class average that saw the highest gains in post-test scores had some of the lowest proportions of non-autonomous feedback in their critiques. These students are moving to either more advanced positions of *multiplicity / relativism* or to the beginning positions of *commitment* (where a student begins to identify a sense of self within their work). For these students, the lower percentages of non-autonomous feedback likely gave them the room to expand their own processes that better align with their own value sets, not the ones necessarily imposed by someone else. The dynamic of the paired settings for these students, however, was likely from a different perspective than of the lowest-rated pre-test students. Instances where a student with a pre-test score of a 4 or 5 was paired with a student having a higher pre-test score, the student with a pre-test score of a 4 or 5 always advanced in their post-test scores. However, when the same type of student was paired with either a student of the same pre-test score, or a lower pre-test score, the post-test scores either regressed or stagnated. This outcome seems to indicate that the cognitive development of students was somewhat influenced by their partnerships. Students with a pre-test score of a 4 or 5 that advanced in their post-test scores might have felt free to self-discover processes and responses without fear of jeopardizing the group dynamic. Whereas students with a pre-test score of 4 or 5 that regressed in their post-test scores might have felt restrained to stay within processual parameters in order to maintain a balanced group dynamic.

8.2 Potential Explanations for the General Regression of the Highest-Rated Pre-Test Scores

Students with pre-test scores of 7 or higher were believed by the interview judges to have at least the beginning positions of *commitment* in their arsenal. While it is plausible to claim too much non-autonomous instruction, or estranged roles within pairings as the responsible party for this regression, a caveat in the Perry scheme exists that offers a different explanation:

“In any of the positions in the main line of development a person may suspend, nullify, or even reverse the process of growth as our scheme defines it... growth, as we saw it, was rarely linear and more usually wavelike. Growth, we felt, usually occurred in surges. Between the surges, a person might pause to explore the implications of his new position. Or he might lie fallow, waiting for the resurgence of strength to meet the next challenge. On occasion he might even have to detach himself from the whole business, or retreat to old positions, in order to assure himself that he was still his own man. Then, after having found that he was still free to choose, he could know any reengagement to be an authentic act, not an enslavement (Perry, 1970).”

It is likely that this regression is a completely natural phenomena amongst these students - that when entering an entirely different field, an initial regress sometimes occurs before further advancement can ensue. Follow-up interviews with these students at later dates would be necessary in order to test this theory. However, within the one semester duration of this study, it is not possible to determine whether this regression is part of a longer natural process, or an example of teaching styles and group pairings having an adverse effect on the cognitive development of these students.

8.3 Appropriateness of Group Pairings in Studio Environments

Collectively, the results from this study bring into question the legitimacy of traditional conventions used for forming groups in studio environments. Many times, teachers form groups that attempt to guarantee at least mediocre results from each group – often pairing someone that is highly skilled in one area, with someone that lacks the same rigor or competency of the same skill. While these pairings typically deliver average, or even above-average outcomes, the formation of the groups in this way emphasizes product over process. What if groups were formed based on cognitive positioning? What if groups were formed based on similar or differential value sets, as opposed to skill sets? Furthermore, are group pairings even an appropriate tool for students with a cognitive score of 7 or higher? If the regression of students with the highest-rated pre-test scores is in any way attributed to adverse effects of group dynamics, the argument could be made that these students would be better off using self-learning pedagogies. While there are inherently other intangible benefits to working in groups, perhaps the aggregate cognitive development of these students could be further advanced using other mechanisms.

Observation of the student-led comments during the desk critiques also brings the effectiveness of group pairings as a tool into question. In some cases, the student with the higher pre-test score dominated the

amount of discussion coming from the student side of the table. When this is the case, does this devalue the currency of critiques to only benefit one student? Are the students with lower pre-test scores than their partners almost entirely learning from their partners' decisions, rather than input from the teachers? Future studies in accessing group dynamics would be needed to provide responses to these questions, but this study nonetheless brings these issues to the fore of studio make-up.

9 IMPLICATIONS

9.1 Student Placement in Courses and Programs

In considering the placement of students in a studio course, much like most courses in the collegiate experience, a tabulation of pre-requisite courses is typically used to determine a students' readiness for a particular course. The assumption being that if a student has simply passed a previous set of courses, then they should be equipped with the tools to take on a more technically-advanced course. However, passive observation of previous studio courses, and of the audio recordings from this study in particular, expose the difficulty that teachers have in mastering the mental gymnastics involved in bouncing around from one student to the next – often having to switch gears from talking to a student with a lower cognitive rating, to one with a higher rating, and then back to a lower rating in back-to-back-to-back succession. By nature, the teacher seems to default to a sort of middle-ground nomenclature of language that can somewhat satisfy the needs of all students without much consideration of an individual's cognitive positioning. This was especially evident in some of the desk critiques involving students with the highest pre-test ratings from this study. Instructing in this format may be an effective tool in nearly assuring that the collective of students in a course meet the middle-ground standards of expectation, however, the results of this study make the case that this type of discourse may be adversely affecting the cognitive development of those yearning a different kind of student-teacher interaction.

What if students were placed in some courses, like studios, based on parameters other than a passing grade in a pre-requisite series of courses? What if students in these courses were placed on the basis of a combination of cognitive standing and self-interest? While future studies would be needed to assess the cognitive movement of students in a course with almost entirely similar cognitive pre-test scores, it is a safe assumption that the role of the teacher in generating individualized discourse would be a much easier task. Perhaps even allowing for more appropriate types of discussion to take place as teachers would only need to adjust their discourse within a narrow range of cognitive typologies.

At an even broader scale, what if students were admitted to programs or placed within programs based more heavily on factors of cognitive positioning? Many design programs have historically placed a large value on the display of technical competency in applicants' portfolios. However the ability to produce an artful expression of one's work does not necessarily correlate with future cohesion within a program, or provide insight to an applicant's own motivations for growth.

9.2 Evaluating Growth

In the context of academic institutions, cognitive growth can be defined in many ways. Much of the American education system, starting at the earliest stages in primary school and many times transpiring all the way through colleges and universities, is focused on meeting pre-determined performance goals at certain checkpoints along the way. Taking into account the diverse make-up of students' cognitive positions within any given course, is it really fair to evaluate change based on a unilateral metric of performance for the entire class? Perhaps a metric more focused on individualized mastery of topics would be more appropriate in this scenario – particularly for students with a score of 7 or higher in the Perry scheme that are seeking to more closely identify their work with a sense of self.

10 LIMITATIONS & FUTURE DIRECTIONS

10.1 Potential for Varying Definitions of Growth among Different Ages, Genders, and Cultural Backgrounds

Furthermore, can it even be assumed that all students have the same definitions of growth in academic setting? Noted in many earlier criticisms of the Perry scheme, is the lack of consideration for age, gender, and cultural biases that may exist. While the Perry scheme, and this study, assumes a general consensus among students to covet positions of *commitment* as the most-advanced positions of cognitive development, this may not necessarily be the opinion of all students. Future studies that use self-defined interpretations of growth for

each student as the metric of pre- and post-test evaluation could provide additional insights into unpacking these biases.

10.2 Lack of Desk Critiques with Individual Students and Individual Teachers

Due to the students working in pairs for nearly the entire semester, it is not possible for this study to determine what differences in teaching styles and cognitive development may have ensued if a more individualized approach were utilized. Additionally, the most prevalent use of the audio-recording devices appeared to occur during studio sessions when both teachers would talk to the student pairings at the same time. While there were occasions when an individual teacher would conduct desk critiques with student pairings without the presence of the other teacher, the use of the audio recording devices in this setting tended to be not as common or would only capture a handful of conversations with some of the students, thus were not included for analysis in this study.

Given this scenario, it also becomes difficult to create a baseline desk critique typology for each student, as opposed to treating the two students in a pairing as one. Had there been a series of desk critiques with individual students throughout the semester, in addition to the critiques with the pairings, it would have been possible to discern which students were heavily influencing the structure of the group critiques. While this study did examine a desk critique with different student pairings from early in the semester, it was not possible to establish an individual baseline from these critiques due to the presence of another student and limited sample size.

10.3 Sample Size and Duration of Study

As previously acknowledged, although the student sample size and duration of this study is limited, it has never been the intent to draw statistical significance from any of these findings. Rather, the purpose of this study is to bring into question some of the traditional techniques that have been long-used in design pedagogy, and to provide a general framework for analyzing student-teacher interactions in relation to cognitive development. Although it would be difficult to increase sample size to levels of statistical significance without expanding to other universities / programs, a more longitudinal approach could yield intriguing results and would be more easily achievable. Would students that regressed in this study experience newfound levels of cognitive growth in the future? Would students that advanced their cognitive position in this study continue on a linear path toward higher levels of commitment? In ways similar to the original Perry studies, it would be interesting to follow students from inception to completion of a program, and track their development through interviews and audio-recordings throughout the process.

10.4 Scoring of Data

Though formulating consensus cognitive positioning ratings for each student was done by the judges with relative ease, a larger sample size would have proven useful to further verify the scores given. In many cases the judges would narrow down possible scores for a student to one of two options (i.e. "she's definitely either a 6 or a 7" or "I think he's either a high 4 or a low 5."), and then they would have to further delve into discussion of specific quotes from the student interviews in order to agree on a final rating. While the judges seemed to exert a high degree of confidence with each score given, changing some of the cognitive position ratings up or down one point would have likely made a difference in the findings of this study.

With this in mind, the willingness for each student to speak and provide explicit details of their beliefs played a prevalent role in the judges determining of ratings. Those that were more extroverted in expressing their thoughts provided more than enough data points to confidently assign a score. Whereas students that were more introverted during the interviews were subject to having larger weight being placed on the comments that were said.

For the desk critiques, using the Goldschmidt coding scheme proved to be an effective method for categorizing teachers' comments. However, the methodology used for coding *non-autonomous clusters* would likely need more definition if used in future studies. In the vast majority of cases it was clear to determine whether the instruction of the teacher was said with autonomous or non-autonomous intent. Being said, intricacies of word choice (i.e. "should" vs "could") and tone (i.e. trustful vs disbelieving) would need more clarification for the metric to be a more encompassing tool in future studies.

10.5 Potential Reactivity of Participants from being Knowingly Recorded

It is plausible to believe that individuals, both student and teacher, may have somewhat altered their behavior as a result of an awareness to being observed. Attempts were made, however, to effectively mitigate

this as a defining factor in this study. During the pre- and post-test interviews, part of the interviewer's role in the beginning stages of each conversation was to establish a sense of rapport with each student as much as possible. These attempts ranged from quick discussions on topics other than those relevant to the study, to clearly explaining the purpose of the interviews as being purely about the students' opinion, and that 'right-and-wrong' answers did not exist. While there were some students that exhibited a physical hesitancy to speak freely in the pre-test interviews, these tendencies were all but absent in the post-test interviews, and did not seem to be much of a factor from the audible nature of the recorded desk critiques. If future studies wished to address this concern with more bravado, then perhaps using an interviewer with a longer-held relationship to the students would be more appropriate.

11 CONCLUSION

Despite the small sample size of students / coded critiques and duration of the study, the correlations found in the cognitive development of students and in tendencies from the desk critiques appear to follow consistent patterns. In particular, the results point to four linkages that were most noteworthy:

1. *The general advancement of students with the average and lowest-rated pre-test cognitive scores.*
2. *The general regression of students with the highest-rated pre-test cognitive scores.*
3. *The tendency of individual students' cognitive positions within each pair to gravitate toward each other over the course of the semester.*
4. *The correlation between more frequent use of non-autonomous clusters with stagnation or regression of students in the average cohort of pre-test cognitive positions (4 and 5).*

Collectively, these linkages bring into question many of the common practices associated with design studio pedagogy. Should critiques be more focused on individual cognitive positioning? Is group work an effective learning mechanism for all students? Should means other than pre-requisite credits be considered for placing students in studio courses? Should there be parameters for evaluating student growth and development other than exemplifying a competency to meet performance goals?

Responses to these questions could serve as the impetus for future research; which is in many ways in high demand due to the lack of educational training that the design educators of today receive. As Dr. Ryan Hargrove, professor in the Landscape Architecture Department at the University of Kentucky, explains (2007, p. 3):

"An examination of design education reveals the lack of instructors' formal training in education / learning theory. While many design instructors are accomplished professionals, this competency does not automatically translate into the skills needed to help others reach their creative potential... Refusing to acknowledge the shortcomings and limitations of the current educational approach is creating inferior conditions across all design professions."

Design educators *need* access to this sort of information. For many, the intricacies involved in educational training or learning theory are all aspects that must be learned on-the-job. While this lone study does not seek to provide answers to these topics, it is the hope that both the methodological framework and findings presented can serve as a useful platform for future research endeavors.

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