Mapping The Critique

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ABSTRACT This case study provides design educators with an assignment they can use to introduce principles of data collection, and a pedagogic space in which to explore quantitative reasoning skills and data visualization strategies. The study describes how, in two sections of an undergraduate Information Design course, the final critique of a mid-term project was replaced with an anonymous survey instead of the traditional delivery of feedback through verbal dialogue. Responses were collated into data sets for each student project, stripped of identifiers to maintain anonymity, and then distributed to the class with the directions to create data visualizations of the critique. Students used various mapping strategies (charts, graphs, and maps) in their visualizations.

The resulting projects provided a variety of means to display the outcomes for the entire class of the preceding assignment and identified specific weaknesses and strengths of each individual project. This paper explores the value of democratizing the critique process, one that ensures that each student's response to the survey is documented and presented with equal weight, and the potential benefit to student learning.

INTRODUCTION

> We are all awash in a sea of numbers that
> increasingly influence our lives.[1]

In the age of "Big Data," information is often quantitative in nature and the ability to analyze information through the filtering of data has been identified as a core competency for success in navigating daily life and participation in a contemporary workforce.[2] This skill, known as Quantitative Reasoning (QR), Quantitative Literacy, or Quantitative Fluency, is characterized by the ability to integrate arithmetic, statistics, visualizations and models (formulas, graphs, tables and schematics) to the analysis and interpretation of quantitative information to draw conclusions in a utilitarian context.[3] Leading educational associations and policy-makers have identified QR as a primary learning outcome for undergraduate education in the 21st century.[4]

Quantification is a process that requires conceptualization and reconceptualization in relation to the object (or phenomenon) being quantified— a leap from the tangible to the abstract and back to the tangible. Within this process, an attribute of the object (or phenomenon) is identified as a unit measure with a proportional relationship to the object. This process could be as mundane as calculating a tip for a meal or as sophisticated as the visualization of unemployment for a particular demographic. Quantitative Reasoning has no specific locus in college degree programs and is often mistakenly assumed to fall within the discipline of mathematics. In fact, undergraduate introductory courses in mathematics tend to focus on abstractness and generality whereas quantitative reasoning by definition is anchored in real-world data within a specific context.[5] Graphic design programs, often assumed to be a safe haven for math-phobic students, may prove to be one pedagogic space for the development and refinement of QR skills at the undergraduate level.

This paper presents a case study of a modified critique process that was introduced midway through two sections of an Information Design course (Fall 2013 and Spring 2015) taught in an undergraduate design program. For the third and final critique of a midterm project, an anonymous survey replaced the traditional delivery of feedback through verbal dialogue. The teacher collated the data from the surveys into sets per student project, stripped responses of identifiers to maintain anonymity, and then distributed the sets to the class. Students were assigned to create data visualizations of the results of the class critique through various mapping strategies. *Mapping the Critique* is an assignment that design educators can utilize to facilitate student understanding of quantitative reasoning though the collection and analysis of the data.

CONTEXT

Queens College, located in the borough of Queens in New York City, is one of the senior colleges of the City University of New York (CUNY). Renowned for the diversity of the student body, almost half of the 19,000 matriculating students were born outside of the United States.[6] The college offers a Bachelor of Science degree in Design, with upwards of 300 declared majors in 2015. Information Design is an upper-division design elective offered to juniors and seniors every third semester. The course explores the display of information and

introduces strategies for designing effective visual communications appropriate for various users, audiences, and platforms. Success within the class requires the utilization of quantitative reasoning (QR) skills as expressed by the ability to analyze data and design representations based on evidence. The course integrates lectures and exercises specifically designed to build QR competencies, including:

• The review of mathematical equations for the calculation of fractions and percentages

• An overview of statistical literacy and the ability to retrieve and accurately read data tables

• Graphing and mapping methodologies

INFORMATION DESIGN, FALL 2013
Enrollment in Information Design, Fall 2013 was predominately female (ten females and four males) and diverse in ethnicity (four Asian; seven Hispanic; three White). Four of the students were born in the United States, and the remaining ten were born elsewhere. A diagnostic quiz administered on the first day of class revealed that only two of the fourteen students could successfully answer all nine of questions that related to the basic calculation of fractions, percentages and knowledge of conventional graphing techniques.

INFORMATION DESIGN, SPRING 2015
Enrollment in Information Design, Spring 2015 was predominately female (fourteen females, two males) and diverse in ethnicity (ten Asian; three Hispanic; two White; one Black). Six of the students were born in the United States, and the remaining 10 were born elsewhere. The diagnostic quiz administered on the first day of class, revealed that only five of the sixteen students could successfully answerall of the questions.

THE DESIGN CRITIQUE

> …the paradox inherent in learning to design places the student in a predicament. He is expected to plunge into designing, trying from the outset to do what he does not yet know how to do, in order to get the sort of experience that will help him learn what designing means.[7]

The design-education experience is analogous to a sink-or-swim method of learning. Students plunge into designing and surface for a period of self-reflection

and group reflection before plunging into the act of designing again. This repetition of design-critique-design creates a tacit transference of knowledge that ideally scaffolds a student's understanding of design processes and competencies.

The design critique is a widely used assessment tool in design studio classes and arguably the single most consistently employed classroom activity—from foundations to senior portfolio—students encounter in an undergraduate design program. Traditionally, the critique consists of project presentations at various stages of completion, and the subsequent feedback provided through peers, teachers, and invited guest critics. A basic tenet of the critique is that the individual and the group benefit from the process; students demonstrate an understanding of design principles and strategies through the work and through the questions, comments, and ensuing dialogue. The objective of the event is to create a collaborative environment that facilitates the development of design and presentation skills and provides a measure of gauging success for a particular project.

Schrand and Eliason's research indicates that the classroom setting does not always allow all types of students to participate, and students who are not confident enough to ask questions are further left behind.[8] Barrett and Percy cite frustration, alienation, and lack of student participation as outcomes of the traditional design critique.[9] Studies of the communicative aspects of the critique assess some of the challenges, and further research yields a list of factors that may impede student learning, including the size and dynamics of the group; language and cultural competencies; and perceived self-efficacy.[11]

That the design critique universally results in the tacit transference of knowledge may not be the typical experience for all students or for all classroom environments. *Mapping the Critique*, proposes an alternative to the traditional critique that produces a greater engagement in the critique process, a more granular assessment for each project and the refinement of QR skills.

THE ASSIGNMENT: MAPPING THE CRITIQUE
Prior assignments to *Mapping the Critique* in Information Design included exercises in the review of calculation of fractions and percentages; retrieval of data from open-source databases; and the creation of tables, graphs, charts, timelines, and maps. The traditional verbal critique was the primary source of feedback for the majority of assignments. In both sections critiques tended to be dominated by a few students, with many students displaying apathetic

behavior such as texting, web surfing, chatting, and dozing during the critique process and participating only when called on. For the third and final critique of a midterm project, the traditional critique was replaced with a nonverbal assessment and developed into a fourth class assignment, *Mapping the Critique*.

Like a traditional critique, the activity began with students pinning their work to the display board. The students received a survey with questions regarding research, originality of topic and solution and the relative success of each project. The Spring 2015 survey added two questions from the original survey distributed in Fall 2013 to distinguish use of color and typography within a design. Students were encouraged to ask questions to clarify the survey questions, but were asked to refrain from making comments about the presented projects. After the completion and collection of a set of surveys, the group repeated the process for each project. Throughout the survey activity, students were instructed to spread out to answer survey questions and to refrain from leaving any identifying information about themselves on the surveys. The teacher generated a numbering system to identify the projects, which received a new set of codes after collection to further minimize the possibility of identification of individuals with survey responses.

Data sets were distributed to students the following week with a group discussion on the method of collection and an assessment of the quality of the data. (Were the sets complete? Should the response "No Answer" be included or ignored?) The discussion was followed with a short lecture on normal (Gaussian) distribution. The next step required students to create a data visualization of the collected data. Upon completion of the data visualization project, students were privately informed of which data set was associated with each of their midterm projects.

RESULTS

STUDENT RESPONSE TO THE SURVEY

Students were invited to comment on the projects after all the surveys had been collected. In both sections, the class comments tended to be short and on-point. When asked for feedback on the experience of completing a survey rather than participating in the traditional critique, students in both sections of the course responded with enthusiasm—several expressed the desire to incorporate the survey into all class critiques. Increased engagement of the class was noticed in subsequent critiques of both sections for the remainder of the semester. A greater number of students participated without prompting and a greater range of opinions were expressed.

	Question 1			Question 2			Question 3			Question 4			Question 5			Question 6			Question 7			Question 8			Question 9		
	Y	N	NA	Y	N	NA	Y	N	NA	Y	N	NA	Y	N	NA	Y	N	NA	Y	N	NA	Y	N	NA	Y	N	NA
Project 1	3	7	3	5	3	5	10	-	3	9	1	3	1	7	5	2	6	5	4	7	3	6	5	2	2	7	4
Project 2	8	3	2	6	5	2	10	1	2	7	3	3	3	6	4	6	4	3	3	10	-	9	2	2	4	7	2
Project 3	6	6	1	3	9	1	10	1	2	9	3	-	3	9	-	-	10	3	6	5	2	10	2	1	4	8	1
Project 4	11	2	1	7	4	2	13	-	-	11	1	1	2	7	3	6	5	2	8	4	1	12	1	-	4	8	1
Project 5	6	7	-	-	12	1	10	2	1	4	8	1	2	11	-	9	3	1	-	12	1	4	9	-	3	8	2
Project 6	8	2	3	6	4	3	10	1	2	9	1	3	3	4	6	5	6	12	7	2	4	9	1	3	6	3	4
Project 7	6	6	1	2	9	2	10	1	2	9	3	-	3	10	-	1	10	2	6	5	2	10	2	1	4	8	1
Project 8	13	-	-	11	2	-	12	1	-	12	1	-	6	7	-	5	5	3	7	4	2	13	-	-	12	1	-
Project 9	13	-	-	12	1	-	13	-	-	13	-	-	6	4	3	10	2	1	11	3	-	10	2	1	10	2	1

Y=Yes; N=No; NA=No Answer
Source: Data collected during an Information Design class (November 2013). Nine students presented midterm projects. Thirteen students completed surveys. Question 1. *Is the topic original?* Question 2. *Is the project ambitious?* Question 3. *Is the designer interested in the project?* Question 4. *Did the designer research the project?* Question 5. *Did the designer explore multiple solutions?* Question 6. *Is the solution original?* Question 7. *Is the project well designed (consider use of color, typography, hierarchy)?* Question 8. *Does the project capture your interest?* Question 9. *Does the project require you to think?* Source: Results of Information Design Survey, Fall 2013.

TABLE 1: *Fall 2013 Information Design Survey Responses.*

	Q1			Q2			Q3			Q4			Q5			Q6			Q7			Q8			Q9*	Q10			Q11		
	Y	N	NA	Y	N	NA	Y	N	NA	Y	N	NA	Y	N	NA	Y	N	NA	Y	N	NA	Y	N	NA		Y	N	NA	Y	N	NA
P1	9	2	1	2	8	2	9	2	1	9	2	1	1	9	2	4	7	1	10	1	1	6	4	2		8	3	1	5	6	1
P2	4	7	1	9	2	1	10	1	1	11	0	1	8	3	1	9	2	1	7	4	1	8	3	1		10	1	1	11	0	1
P3	2	9	1	10	1	1	11	0	1	11	0	1	8	3	1	9	2	1	11	1	1	11	0	1		11	0	1	7	4	1
P4	5	6	1	1	10	1	8	3	1	3	8	1	0	10	2	7	4	1	9	2	1	6	5	1		2	9	1	3	8	1
P5	12	0	0	6	6	0	12	0	0	2	10	0	3	9	0	8	4	0	12	0	0	11	1	0		10	2	0	3	9	0
P6	7	5	0	6	6	0	8	4	0	12	0	0	6	6	0	5	7	0	9	3	0	9	3	0		7	5	0	8	4	0
P7	6	5	1	3	8	1	8	3	1	11	0	1	1	10	1	3	8	1	8	3	1	5	6	1		4	7	1	11	0	1
P8	7	5	0	7	5	0	10	2	0	9	3	0	5	7	1	8	3	1	7	4	1	**				9	3	0	4	8	0
P9	8	4	0	8	4	0	11	1	0	2	10	0	3	8	1	7	5	0	0	12	0	10	0	2		10	2	0	6	6	0
P10	8	4	0	5	7	0	9	3	0	5	7	0	6	6	0	8	4	0	8	4	0	4	8	0		6	6	0	6	6	0
P11	10	1	1	8	3	1	11	0	1	3	7	2	7	3	2	8	3	1	4	7	1	6	5	1		9	2	1	9	2	1
P12	10	2	0	9	3	0	12	0	0	12	0	0	9	3	1	8	3	1	12	0	0	11	1	0		11	1	0	5	7	0

P=Student Project
Q= Question from survey
Y=Yes; N=No; NA=No Answer
Source: Data collected during an Information Design class (November 2013). Nine students presented midterm projects. Thirteen students completed surveys. Question 1. *Is the topic original?* Question 2. *Is the project ambitious?* Question 3. *Is the designer interested in the project?* Question 4. *Did the designer research the project?* Question 5. *Did the designer explore multiple solutions?* Question 6. *Is the solution original?* Question 7. *Effective use of hierarchy (clarity of information)?* Question 8. *Is the typography effective and appropriate to project?* Question 9. *Effective use of color?* Question 10. *Does the project capture your interest?* Question 11. *Does the project require you to think?*
*Q9 was discarded from the data set due to recording error
** Data missing from Project 8, Question 8
Source: Results of Information Design Survey, Spring 2015

TABLE 2: *Spring 2015 Information Design Survey Responses.*

SURVEY RESULTS

As Table 1 shows, the survey asked nine questions for each of the projects presented. The options for response to the questions were yes (Y), no (N), or no answer (NA). Nine students presented midterm projects and thirteen students participated in the survey exercise in Fall 2013. As Table 2 shows, twelve students presented midterm projects and twelve students participated in the survey exercise in Spring 2015.

As this was the third and final critique of the midterm assignment, students were familiar with the projects presented. Responses from Fall 2013 revealed a greater range of opinions—and generally a more critical response—than comments made during the previous two class critiques. The group reached consensus on certain projects—Projects (P) 8 and 9 received a majority of positive ("yes") scores for all categories, while P3 received a majority of negative ("no") responses—but most projects received a mix of responses, indicating that they were often successful in some areas and unsuccessful in others.

For example, P2 received positive ratings for designer's interest in the project and negative ratings for the design of the project. As P7, Question (Q) 7 demonstrates, the group did not consistently establish consensus in all categories—six students answered P7Q7 "yes," five said "no," and two students chose not to respond. As assigned, students created posters of their data visualizations.

Responses from Spring 2015 were generally more positive than survey results from Fall 2013. Project P3 and P12 received a majority of positive ("yes") responses and P4 and P10 received a majority of negative ("no") responses. Unlike Fall 2013 responses, certain areas were not identified as successful and others unsuccessful, most projects received a mixed response. The mode of presentation of data visualizations projects were left open to student choice and a number of students opted to present their data visualizations as interactive web based solutions.
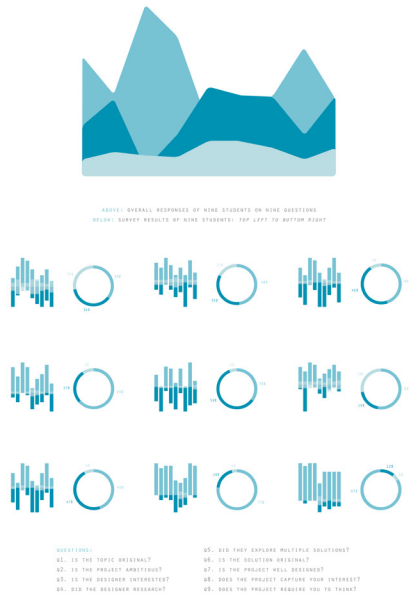
FIGURE 1: *Serom Lee, Mapping the Critique, Fall 2013.*

FIGURE 2: *Fatimah Anwar, Mapping the Critique, Spring 2015.*
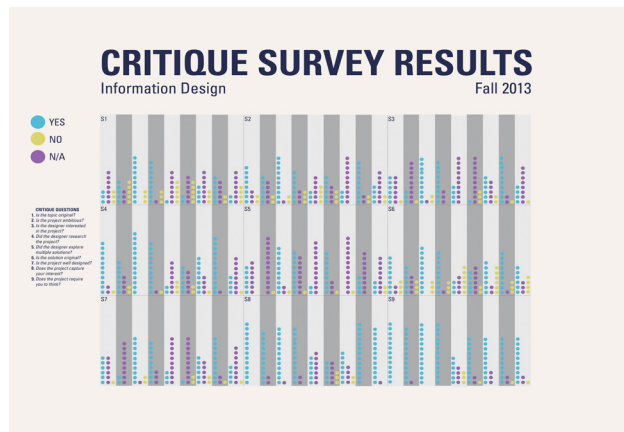

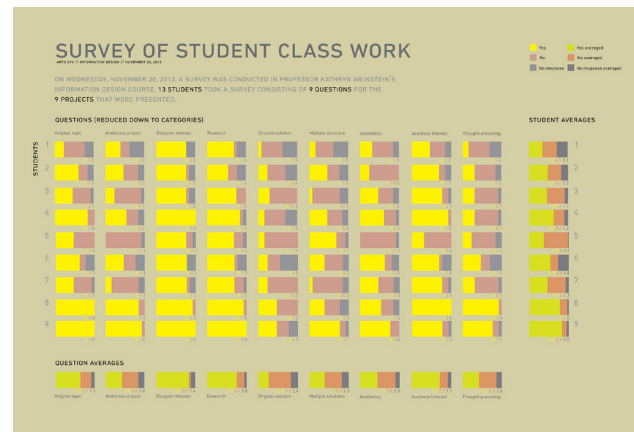FIGURE 3: *Madison Chajon, Mapping the Critique, Fall 2013.*

FIGURE 4: *Praveena Persuad, Mapping the Critique, Fall 2013.*

Figure 1–9 shows students' solutions to the assignment of *Mapping the Critique*. Student efforts reveal a wide array of original solutions and the ability to visualize data through the use of graphs, charts, and diagrams.
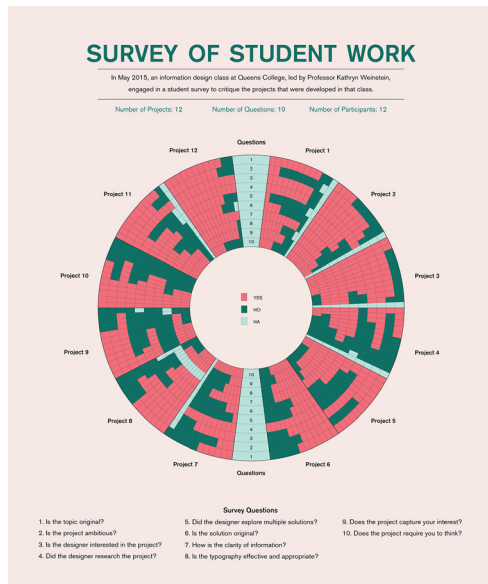
FIGURE 5: *Samiha Meah, Mapping the Critique, Spring* 2015.
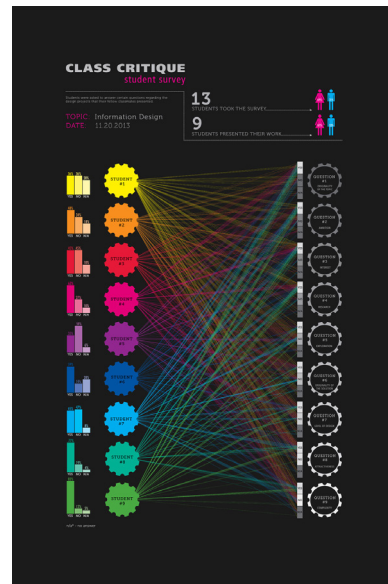
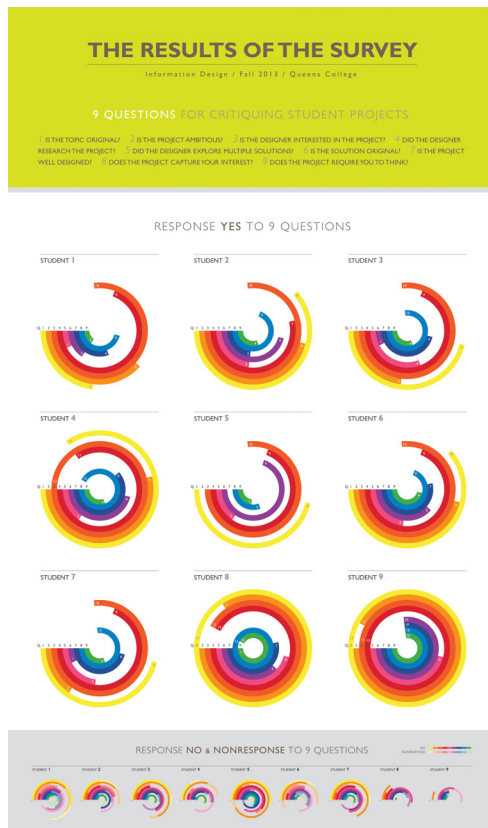FIGURE 6: *Elena Akulova, Mapping the Critique, Fall* 2013.

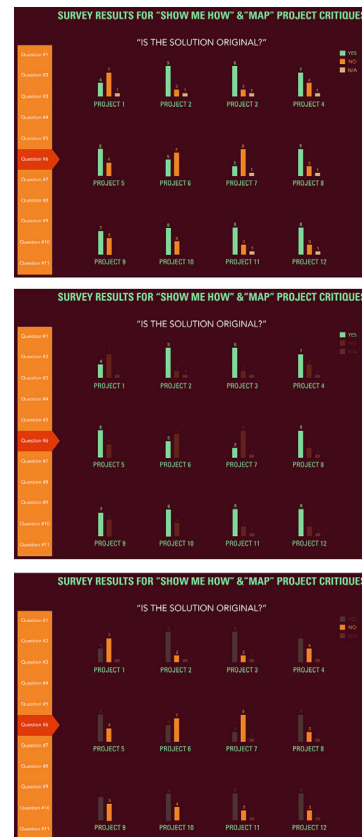FIGURE 7: *Okhee Kim, Mapping the Critique, Fall* 2013.

FIGURE 8: *Emelin Herrera, Mapping the Critique, Spring* 2015.

FIGURE 9: *Twaambo Moyo, Mapping the Critique, Spring 2015.*

CONCLUSION

The assignment *Mapping the Critique* introduces students to data collection and analysis in an area in which all students possess a degree of authority: critiquing one another's assignments. The assignment provides an opportunity for students to work with a small set of data and decide how best to represent the information. This process requires students to navigate from the tangible (survey results) to the abstract (determination of equations, relationships of the data sets, and questions) and back to a tangible (expression of the data).

The projects created for the assignment demonstrate a wide range of solutions and a variety of lenses through which the data may be assessed. Throughout the course, lectures, exercises, and assignments were organized to build competencies in QR through the calculation of fractions and percentages; the reading and formatting of tables; and the development of mapping and graphing strategies. *Mapping the Critique* required that students incorporate learning from former lessons to create data visualizations that were rich in data and ultimately useful tools for the understanding of student and class performance for a particular assignment. The ensuing critique of *Mapping the Critique* revealed that students had become savvy readers of information—catching inaccuracies or discovering fundamental flaws in the strategies of the display of information. Students in both

sections of the course appear to have gained competencies in QR skills that were lacking at the beginning of the course, by demonstrating their improved ability to employ equations to calculate fractions and percentages, assess data, and employ sound strategies in their visualizations.

Furthermore, *Mapping the Critique* provides teachers with a tool to democratize the critique process. In addition to the traditional forms of design critique, the survey may provide a venue for students who typically refrain from verbal exchange in a group setting to express their opinions. The student work and the ensuing critiques seemed to be energized by the survey experiment, as demonstrated through a greater degree of participation without prompting from all students and a greater range of opinions expressed. Apathetic behavior such as texting, chatting, dozing was noticeably absent in subsequent classroom critiques during and following *Mapping the Critique* assignment. English was not the first language of the majority of students enrolled in Information Design, and the degree of fluency may be a primary barrier to participation in traditional design critiques. The use of a survey in lieu of a verbal critique appears to have engendered students to participate fully in classroom critiques, even after the survey was replaced with a traditional design critique.

The specificity of the responses to survey questions may provide students with an effective feedback loop that is obscured through the traditional process of verbal critique. Both the act of responding to a consistent set of questions and that of receiving itemized responses of the survey reinforce the criteria of a project and highlight the areas of success or needed improvement per student. For students who have plunged into the sea of design and are at risk of drowning before they learn to swim, the survey may be one of a set of tools that can demystify the process of design and measure individual progress.

BIOGRAPHY

Kathryn Weinstein is Associate Professor of Graphic Design at Queens College, CUNY. Her work spans media, including web interface design, print design and photography. Much of her work has focused on not-for-profit institutions, including arts foundations, local health and housing services, legal defense and youth services. She has received funding from CUNY Workforce Development Initiative, PSC CUNY and CUNY Service Corps to implement internship programs and track career pathways of former interns. She is co-founder and co-director of Design Incubation.

NOTES

1 Steen, Lynn A. "Adrift in a Sea of Numbers." Honors Day Convocation, St Olaf College. 2009. Accessed November 28, 2015. http://www.stolaf.edu/people/steen/Papers/09adrift.pdf.

2 Elrod, Susan. "Quantitative Reasoning: The Next 'Across the Curriculum' Movement." Association of American Colleges & Universities. 2012. Accessed November 1, 2015. https://www.aacu.org/peerreview/2014/summer/elrod.

3 "Quantitative Reasoning for College Graduates: A Complement to the Standards." Accessed November 28, 2015. http://www.maa.org/programs/faculty-and-departments/curriculum-department-guidelines-recommendations/quantitative-literacy/quantitative-reasoning-college-graduates.

4 *College Learning for the New Global Century*: A Report from the National Leadership Council for Liberal Education & America's Promise. Washington, D.C.: Association of American Colleges and Universities, 2007.

5 Mayes, Robert L., Franziska I. Peterson, Rachel Bonilla. "Quantitative Reasoning in Context." WISDOMe Monograph Volume 2: Quantitative Reasoning and Mathematical Modeling: A Driver for STEM Integrated Education and Teaching in Context, Robert Mayes & Larry Hatfield (Ed.) Laramie, Wyoming: University of Wyoming, 2012. http://digitalcommons.georgiasouthern.edu/teaching-learning-facpubs/17

6 QC at a Glance, Queens College, CUNY, 2015. Accessed November 28, 2015. http://www.qc.cuny.edu/about/Glance/Pages/default.aspx.

7 Schön, Donald. A. Educating the Reflective Practitioner: Toward a New Design for Teaching and Learning in the Professions. San Francisco: Jossey-Bass, 1987. 93.

8 Schrand, Tom, and John Eliason. "Feedback Practices and Signature Pedagogies: What Can the Liberal Arts Learn from the Design Critique?" Teaching in Higher Education 17, no. 1 (2012): 51-62.

9 Barrett, Terry. "Studio Critiques of Student Art: As They Are, as They Could Be With Mentoring." Theory Into Practice 39, no. 1 (2000): 29-35.; Text from note 10

10   Percy, Christine. "Critical Absence versus Critical Engagement. Problematics of the Crit in Design Learning and Teaching." Art, Design & Communication in Higher Education 2, no. 3 (2004): 143-54.

11   Blair, Bernadette. "At the End of a Huge Crit in the Summer, It Was Crap I'd Worked Really Hard but All She Said Was Fine and I Was Gutted." Art, Design & Communication in Higher Education 5, no. 2 (2007): 83-95.; Text from note 12; note 13; note 14

12   Gray, Colin M. "Informal Peer Critique and the Negotiation of Habitus in a Design Studio." Art, Design & Communication in Higher Education 12, no. 2 (2013):195-209.

13   Wong, Ho Lan Helena. "Critique: A Communicative Event in Design Education." Visible Language 45. no.2 (2011):222-247.

14   Gaffney, Amy L. Housley. "Measuring Students' Self-Efficacy for Communication." International Journal of Art & Design Education 30 no. 2 (2011): 211-25.