

KEN-KEN

SUDOKU

PhD COMICS

Issue 1 Vol. 4

HUDN

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WINTERFALL 2011

TOWARDS

CAUSALITY:

taking new measures with Prof. Elizabeth Tipton

In this issue

Life After TC

Recent PhD graduate Ayelet Segal takes her degree to the marketplace

Drawing on the interdisciplinarity of our Cognition

PhD Candidate Andrea Kantowitz explores the ART in Thinking

Segmenting and Connecting: Part II

What we can learn from Comics and other visual depictions

ECOpinion:
OCCupy
EDUcation!

SNOW...



before Halloween?



with Michael Swart

When Elizabeth Tipton was in the fifth grade, she had a puzzle book, full of logic problems that she carried around everywhere she went. “I’ve always been a problem solver and I see math as problem solving. Math is another language, with its own symbols. We take words, represent what they say mathematically, and then solve the puzzle. I love the moment when you figure out how to do something- that ‘a-ha moment’!”

If you like using data to make sense of things, you’ve got something in common with Elizabeth Tipton. Mrs. Tipton, happens to be Assistant Professor Tipton, and she’s the newest member of the Department of Human Development’s faculty. Fresh from Northwestern University in Chicago– (CHI town, s’up Cubs!), her talents include extensive experience analyzing data, the kind that dictates policy.

HUD’s newest faculty member, Assistant Professor Elizabeth Tipton in the statistics program.



Table of Contents:

Welcome Elizabeth Tipton	2-5
PhD Comics	4
Friendly Reminder	5
*	
Part II: Segmenting and Connecting	6-10
Sudoku Puzzle	9
*	
Life After Ph.D.	11-16
Ken-Ken	16
*	
Thinking Through Drawing	17-21
*	
ECOPINION: Occupy Education	22-26
Photograph	27
*	

Elizabeth grew up in Berea, Kentucky, a town of about 10,000 people. “It’s the arts and crafts capital of Kentucky. Many people were tobacco farmers in the surrounding areas, but Berea became this community of artists and crafts people. There’s no movie theatre, no mall— just Wal-Mart and Berea College— a small liberal arts school. I was an outdoorsy girl scout who enjoyed camping; more of the hands-on activities. I wasn’t much for selling cookies,” she said smiling.

“I became really interested in math in middle school, which is the moment when most girls drop pursuing math. I was on the academic team and did well which encouraged me and I started to get ahead. I had a teacher in high school that pushed me to double up on my math courses so I could start taking calculus at the nearby college my junior year.”

In her non-mathtivities during high school, Elizabeth acted on the stage, did set and lighting design in the theatre, ran cross country, track and was a class officer. “I was usually running, practicing, or running to practice”



In her undergrad Elizabeth majored in Math and minored in English and Sociology. She says that’s what emboldened her interest in social issues and inequality. Not long after, Elizabeth pursued the power of quantitative methods in the social sciences by beginning a Ph.D. program at the University of Chicago. After a few years, Elizabeth discovered that it wasn’t the associated applications that sparked her interests but the methods that attracted her most, and she parted with the program.



“It was at this time that I started dating my husband. He joined *Teach for America* and we moved to the Navajo Indian reservation. For three years, I found myself working at a community college, teaching Developmental Math [algebra] and English [essay writing] as an adjunct professor. Full time, I ran the Adult-ED program and ended up doing a lot of placement testing.” Mrs. Tipton had an a-ha moment!

“We were using tests based on normalized data for a very specialized, non-normative sample. I thought that there had to be ways to improve the measures that we were using. That’s when I realized that it was time for me to get good at developing them.” She paused, nodded, “I wanted to do education research through statistics; more focus on the methods than the applications.” A methodmorphosis had taken place.

In 2006, Elizabeth started a new Ph.D. program in Statistics at Northwestern. From 2007 to 2010 she was a fellow at Northwestern’s Institute for Education Sciences (IES) Pre-doctoral Fellowship Program. That means she took a lot of classes in education and social sciences in addition to all her statistics coursework!

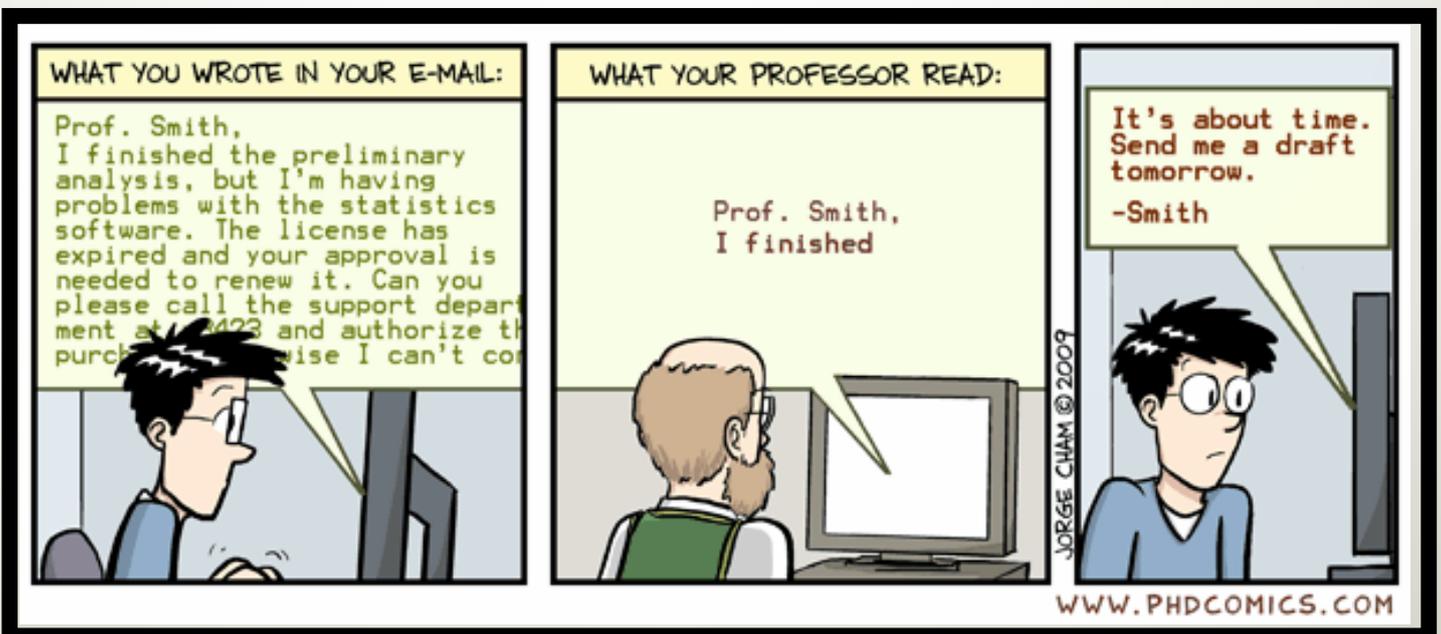
Tipton’s dissertation focused on methods for generalizing from experiments. One part of this work was on improving estimates of causal impacts by taking into account information on the population of policy relevance. “For example, we might be interested in the causal effect of a mentor program on elementary school students. We perform an experiment on a convenience sample of 40 schools, but we’re *really* interested in the

impact on the whole state. That’s why we need to develop better ways to generalize our data.”

Another bulk of Elizabeth Tipton’s work and interest is in meta-analysis. “In many instances, researchers collect more than one outcome. For example, in psychology studies both a depression and an anxiety inventory may be reported. A problem that occurs in many meta-analyses is that these outcomes are often correlated. Part of my work focuses on what to do in these cases.” Would that be a meta-methodmorphosis?

After defending her dissertation in April 2011 and graduating in June, Dr. Tipton entered into an economy rife with uncertainty. “The job market has a bit of luck in that someone has to be hiring in the field of your specialty. I was very fortunate that TC was hiring for exactly what I do.” Professor Elizabeth Tipton started here at Teachers College in September, and true to form, hit the ground running.

Since moving to New York City, she has enjoyed the transition from Chicago. Her husband took a job on the administrative side of *Teach For America* and they live happily in the Seth Low housing. “We’ve only been here four months, so every weekend we are exploring



neighborhoods, looking for coffee shops, going to museums. We're still pretty much tourists and we'll be tourists in NY for a while. There is a lot to see. Coming from one big city to another, we haven't had a car for a while and we are used to mass transit. Simple walks around the neighborhood to find new areas. We've enjoyed being able to walk anywhere- it's a pedestrian city. Take the train to Broadway-Lafayette and voila, there you are in the middle of everything. I like the hustle and bustle."

Currently, Professor Tipton teaches Applied Regression Analysis, HUDM 5122. "I want students to understand the math and carefully understand both the affordances and limitations of regression. I want students to leave being able to analyze their data and get meaning out of their work."

"The midterm focused on terms: What is regression? Can you read an SPSS output? However, the end of the class will entail a final project for which students work in pairs (using the ECLS: Early Childhood Longitudinal Study 3rd Grade) and put into practice all the skills they've developed over the semester."

"I find that there is balance in showing students the underlying math even though most of them aren't going on to do math. They still need

to be able to run their models and work the data from their experiments and analyses."

Of, course, with Professor Tipton, there's still more to explore. "Ideally, I'd like to also start teaching a class on causal inference, including techniques like propensity score matching, quasi-experiments and others; oh, and I'd also like to teach a course on meta-analysis."

"I do work that is different than the other people in our program, so if students have questions about my work, or how it relates to their work, my door is always open. I invite anyone to come and have a conversation- let's share ideas."

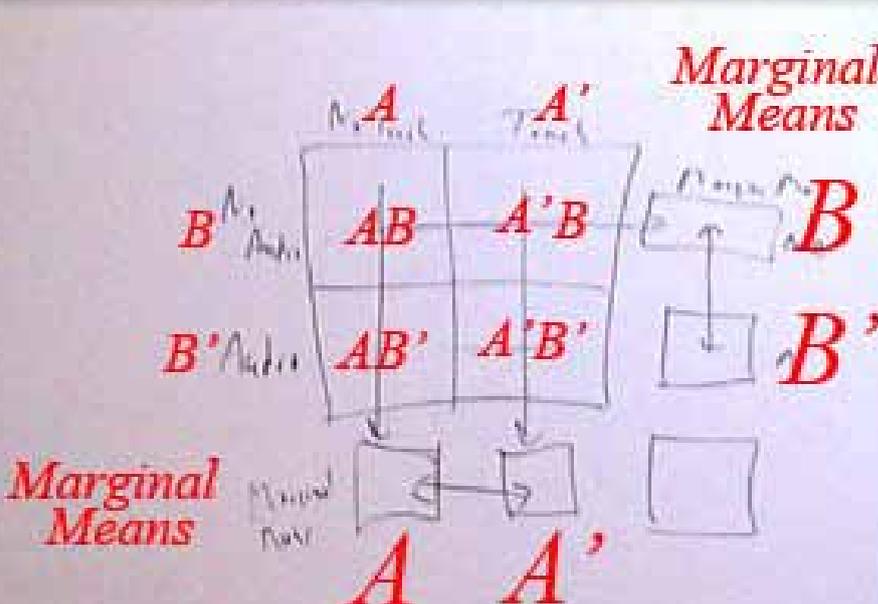
Professor Tipton's enthusiasm and energy is a going to be great for the the Department of Human Development and Teachers College. Her expertise will enrich our perspectives and help us decipher and depict the significance of our work. She'll help maximize our impact and help forge better methods of analyzing and enacting data. Let's welcome her. If you see her, say, "Hello."

Professor Tipton's office is located in the HUD office on the 4th Floor of Grace Dodge, Rm. 453G or contact her via email at let2119@tc.columbia.edu



Friends Help

Friends Find



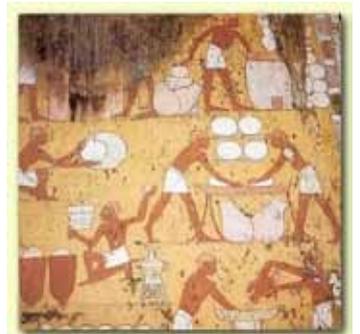
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SEGMENTING & CONNECTING: FROM EVENT PERCEPTION TO COMICS

Visual explanations using pictorial narratives go far back in history. Pictorial representations on how to bake bread appear in Egyptian tombs (right). Today, we find assembly instructions on many of the things we buy, like a new bar-b-que, that typically has a narrative using diagrams, words, and gestures.



In comics, the question becomes, “How do we describe our perceptions and cognitions and weave them together into a narrative or story, and in particular, how do we do this in our depictions.” The kinds of discourse that we use would be **conversations** (short interchanges that are usually collaborative), **descriptions** (emphasizing the structure of things), **explanations** (causes, behaviors or processes that explain why), **arguments** (use evidence to make a point) and **stories** (that necessarily have a narrative voice with a particular perspective, and can sometimes have with a protagonist and antagonist to convey suspense, drama or emotion).



Professor Tversy

HINT- This is a PDF, zoom in to see the artwork!

KEYBOARD: “ **command/cntrl** ” and “ + ” or “ - ”

PART II-B: Poetic devices and beyond that are utilized by comics.

Tversky and her colleagues tried to see if we could map all the visual devices onto the rhetorical greek literary devices. First, the answer is “no”. There are categories in the visual lexicon that are hard to name and that the Greeks never conceived.

Irony is usually expressed by a contrast between the words and pictures. In this page from Marjane Satrapi’s graphic novel,



Persepolis (right), we see the imagination of an eight-year old girl. She overhears a conversation about her uncle, who was cut into pieces, and can see the contrast between what the adults meant in the conversation and the young girl interpreted it. Similarly, from Gaiman’s work at left, we see, we see another child’s interpretation of someone being “rubbed out”. In England, an eraser is referred to as a rubber, so she imagines the subject of the conversation being erased when, in fact, the adults are talking about murder. The next example, by Steinberg, shows the irony between “DON’T” do something as you do it.



Metaphor. A graphic (left) depicts the burning of books and all the wisdom of the ages going up into flames. On the cover of a turn of the 19th century *Los Angeles Sunday Times* (left), graphics depict a man a man running the streets of New York that morph into a treadmill, conveying the ad infinitum notion of running the rat race.

A third graphic (left) depicts Little Nemo in his bed as he starts to dream. Suddenly, his bed grows legs and takes him wherever his dream is going, much the way that our beds allow us to venture on our own dreams. And, just like our own dreams, the bed eventually drops when the long legs return to normal and the dream ends without resolution.



Puns. In the graphic on the left, a green lady is engaged in a conspiracy with three men on the phone. In this instance, the phone cord not only connects their conversation, but it also literally frames the nature of their interaction while serving serving as the metaphor for winding conspiracy amongst the perpetrators.

Polysemy. This New Yorker cover by Bob Staake from 2008 (right) depicts Washington D.C. where the moon in the sky is both the “o” in *New Yorker* as well as the “O” from Obama.



Figure and Ground. One can tell two stories at the same time by alternating between the background and the figure, much the same way that your mind may be alternating between thoughts. In the comic to the left, the figure and ground, the words and the noises in the words can convey the action and the noise.

Meta-post. This occurs when the drawing or depiction itself shows a sense of self-awareness. On the left, the story is inside while Steinberg is telling the story by drawing himself.



Spatial punning on time. In this Feinberg comic (left), he is boasting of his entertaining many women while his girlfriend at MIT is also entertaining many men. This illustration shows him passing a letter and the middle frame shows its passage not only over the actual distance but is also indicative of the metaphorical distance in the scene.

Coming out of the frame. At right is another meta-device in which the pig decides to leave the story by peaking out between the frames and breaking the fourth wall. After the wolf has just blown down his house, he decides that it is safer outside the frames and he comes back to warn the next pig to get out! Operative here is the role of the frames and how the boundaries of the frames set the various stages for both communicating and movement in and out of the narrative. There is the story within the frames and then the story between the frames.





Metaphor & Pun. At left, another Steinberg illustration uses the metaphor of crumbled pieces of paper on the side of the room with the notion of having ideas (represented by clouds) that have also plummeted into discarded abandonment. This cover (right) of the *Chicago Sun Times* uses the notion of the puppet government.

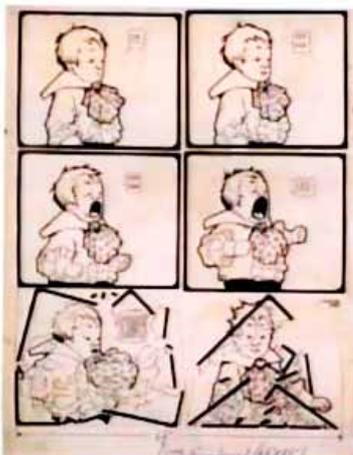


Chicago Sun Times uses the notion of the puppet government.

Visual Juxtaposition. In this comic to the right, we see two frames from the mafia story mentioned earlier by Gaiman. People are tied to chairs and are about to be executed by Al Capone in the first frame. On the far right are children at a birthday party playing musical chairs. Here, the chairs serve as a the linking element and the juxtaposition provides the stark contrasts between the merriment of the party and the horrific scene about to unfold.



Onomatopoeia & Rhythm. The Krazy Kat comic (left) suggests going downhill rapidly and does so by tilting the entire scene on end. It conveys the feeling of speed and urgency; in addition to the sequential pattern of the frames that gives a rhythmicity to the event. The second comic (left below) also conveys those moments leading up to a sneeze and we can hear the “ah- ah- ah- choo” and feel the force as it breaks the frame of the comic!



Symbol & Foreshadowing. The graphic novel, *Maus*, is Art Spiegelman’s memoir of Germany before World War II. On the right, we see his parents, the two adult mice out taking a walk under the stars, unaware of what is to come. However, we the viewer see the larger scene and the sidewalk that extends in multiple directions forming the shape of a swastika and foreshadowing the future.



Blends. Speigelmen’s *In the Shadow No Towers* (right) depicts what he saw on the morning of September 11, 2001 from his home in Brooklyn, NY. At the top of the page, the panels of action between characters describing the events of the morning morph into an illustration of what they are describing.



We see; A similar technique at the bottom of the page has the panels morph into an exclamation point as the only means to express the emotional quotient of the event. The next comic (left) depicts Galileo’s observations using his telescope. Here, the four frames are united by the common circle blended in all four. The first panel shows the view from inside the telescope looking at Galileo looking in and the next two show what he was observing while the last shows Galileo by the window in his study recording his observations of the night sky.



Overall, visual narratives often employ visual devices like frames, arrows, links and nodes. These are the visual vocabularies, the geometric elements of schematics that have formulate meaning in a larger gestalt within given contexts. These visual means and devices for breaking up time and space, depict time and space, and link time and space to create meaning in the spacetime continuum..

Since humans earliest days, we have been depicting information and conveying our thoughts through pictures. Over time, the sophistication of our semiotics have developed into a rich array of technique with which we can express ourselves. Professor Tversky continues to explore these concepts in a number of classes here at Teachers College including *Visual Explanations* and *Spatial Thinking*, in addition to continuing research with her students. If you’d like to explore more, look for part 3 in this series next semester, *Researching the question, “Do Frames show Space or Action?”* or in the mean spacetime, contact Professor BarbaraTversky directly at: btversky@stanford.edu.

Also see Tversky, B. (2011), *Visualizing Thought*. Topics in Cognitive Science, 3: 499–535.

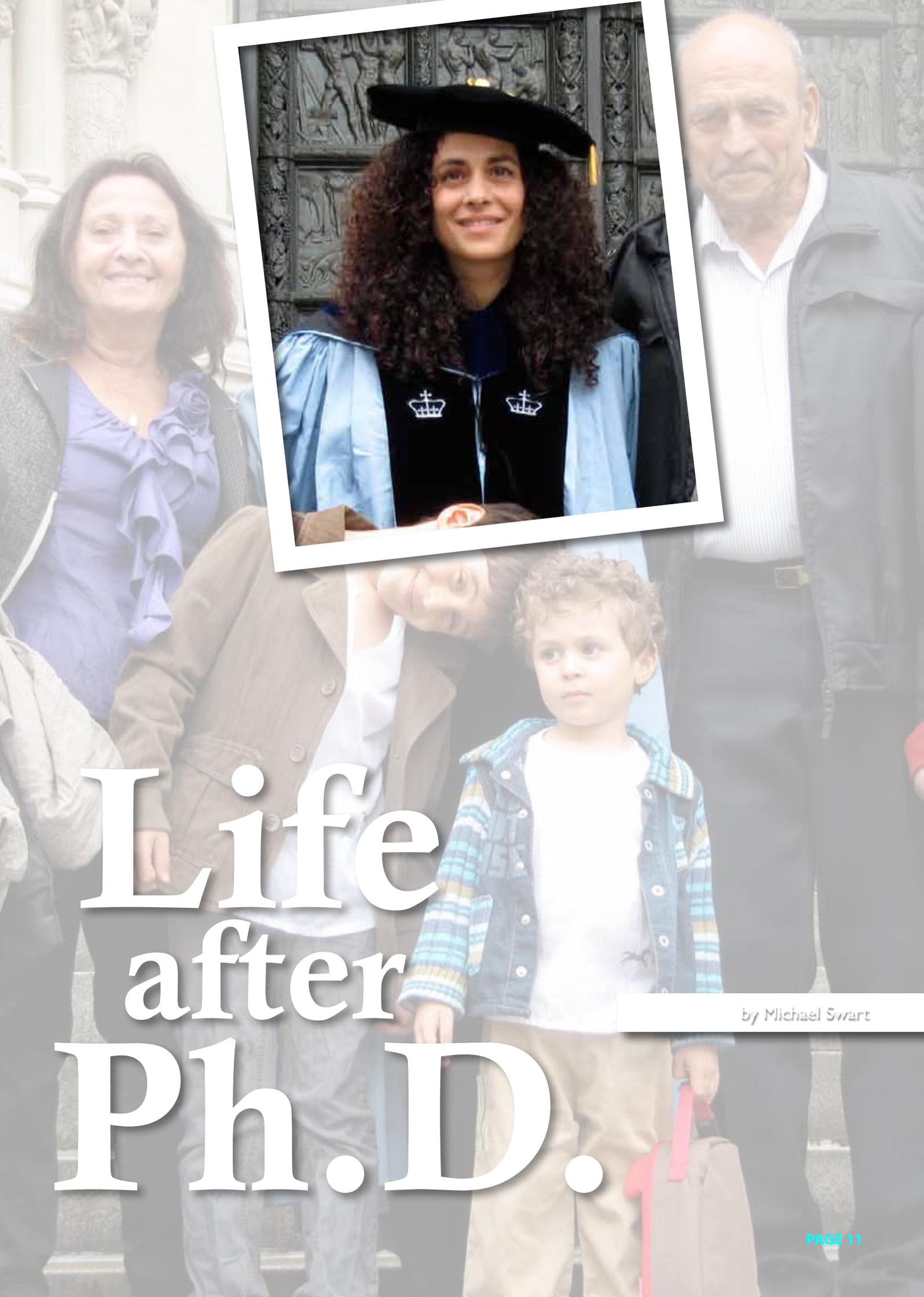
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Life after Ph.D.

by Michael Swart



By the time Ayelet Segel finished her Ph.D. in May of 2011, she had been steadfastly working on her her company, *iGeneration*, and their first release, *Math Glow*. A fun game for the iPhone and iPad where young learners race cars and count quantities, learning both estimation skills as well arithmetic.

Ayelet’s venture into educational gaming is pioneering a growing trend amongst many HUD students. *Math Glow* is based on Ayelet’s dissertation research in the Cognitive Studies in Education Program under the advisement of Professors John Black and Barbara Tversky (for whom Ayelet is very grateful). *Math Glow* not only helps develop vital math skills, but it also provides parents with the opportunity to follow their child’s progress and be involved in their child’s learning.

Ayelet was born in a suburb of Tel Aviv, Ramat Efal, and remembers being in the Israeli version of Girl Scouts and working on a **Kibbutz** when she was younger. “I was a nerd for sure, but Girl Scouts are very different than they are in the States. Scouts is seen as cooler there than it seems to be here and I think, from what I hear, that the Israeli version is a little more rugged, working hard in the fields and teaching survival skills.... Eventually, I served in the Israeli Defense Force [IDF] as an instructor for the air Defense.” [Btw, military service is mandatory for all Israeli citizens] “My job was Airplane recognition; I had train soldiers to identify any airplane or helicopter by naked eye sight according

to the distinguishing features. You knew which airplanes were flown by each country and under eminent threat in the heat of battle you it was essential to know if the aircraft was friend or foe.”

Ayelet came to the US initially in 2000 with a job offer as the Art Director for Quiqnoc, a firm here in New York City. She had just finished her masters degree in Interactive Media at a school in London and the “.com boom!” was in full scale. Before that, she studied graphic design in Israel at VITAL (a design school). “For the first two years of my undergrad, we had to learn to sketch and do hard-table art, develop our own style. We never worked on the computer until after that period of core training. After that, I became interested in and eventually taught interactive media which led me to London that led me to New York and, eh, here.”



In this photo, women are training at kibbutz Mishmar Ha’Emek during the 1948 Arab–Israeli War.

A member of a **kibbutz** is called a *kibbutznik*. *Kibbutzim* (pl.) are collective communities in Israel that were traditionally based on agriculture. The word “kibbutz” literally translates to “gathering, clustering”. Today, there are many more economic branches, including industrial plants and high-tech enterprises. Kibbutzim began as utopian communities, a combination of socialism and Zionism. In recent decades, some kibbutzim have been privatized and changes have been made in the communal lifestyle. In 2010, there were 270 kibbutzim in Israel accounting for US\$8 billion (9%) of Israel’s Industrial and \$1.7 billion (40%) Israel’s agricultural output.

“At Quignoc, everything was new and really exciting. We built the creative department from scratch. Originally, Quignoc did back-end technology but they had ventured into e-consulting and created the creative division. It was a crazy time. Unfortunately, the tech-bubble'd for two years and Quignoc folded. That's when I decided to go back to school to pursue a field that I thought would be more rewarding and have a substantial and pro-social aspect.”

Ayelet started at TC in 2004 after a brief hiatus back in Israel where she started her own company called *Mornings for Sale*. “I did websites and design. We had clients that included *REAL* (for their One Player), two wall street firms, *AMDOCS* and *CON-FIRM*, among others. When I got back to the States, I taught in the Katherine Gibbs school and eventually joined TC in spring of 2004.”

Initially, Ayelet matriculated in the MST Department in the CCTE program, but moved soon after to the Cognitive Studies program. “What I was missing was the cognition and developmental perspective for interactive media. I wanted something that complimented the work I had been doing for the previous 7 years.

Fortunately, I was able to attend school full time and was a TA for the Human Computer Interaction course.” (Good luck finding the course nowadays, though continuing in TCradition, it's still listed in the course catalogue).

“It took me almost 5 years to complete my coursework, but in that time, I took nearly a year and a half to welcome my two children into the world, Ore and Neave. They are four and seven now and very energetic. Having them made a big impact on my understanding of their cognitive development as well as their social development. As a mom and also professionally, I learned so much. My husband jokes that I am the sort of mom that has to have a Ph.D and works very hard. Observing them has strengthened my professional focus on education. Before I got to TC, I thought I wanted to develop technologies for helping youngsters with learning disabilities like dyscalculia and dyslexia, but I found that so many of those instances are so specific and it is hard to generalize.”

Ayelet's master's work was producing an edutainment CD-Rom about the four elements of the environment (air, water, earth and fire) in which the user made gestures that were representative of the elements.

“For fire, they made very fast, short gestures; for air, it was very long, lofty slower gestures; for water they had to express the resistance of moving through it; and for earth, it was about fighting gravity. The name of the game was *BEO* and it was programmed in director LINGO, which advanced at the time. My dissertation work ended up being the newer, updated instantiation of edutainment— an app for the iPad. It's only looking back on it now that I realize how connected my master's work was to my dissertation which focused on the congruency of gesture.”



“The first technology I came across was Microsoft® SURFACE.

When I saw these new touch devices that utilized gestural interface, I knew that

was what I wanted to research. I knew that it would be increasingly important to not only develop but to develop correctly. And, to find out how children and young learners used it and what ways would be most effective for using this technology as a learning tool.”

This was around the time in 2005 when Dr. Maggie Chan was publishing her work on simulations with Professor John Black (*see* Chan & Black, 2006). “My thought at the time was that the simulation, rather than using a slider controlled by the mouse, should employ a better method of interactivity that “embodied” the action. Gestures should be congruent with the concepts being learned. Under these considerations, I started investigating the embodiment literature [Barsalou et al.] as well as the literature on gesture [Goldin-Medow et al., Tversky et al.] and peppered it with Elenor Gibson’s work on the world as a big interface. The more I explored these two fields, the more I started to focus on the work that would eventually become my dissertation.”

Initially, Ayelet was looking into developing a game that explored the tenegram [*see* Bjork et al.] because she wanted to show mental rotation and how that should be congruent with the physical representation. Instead, she focused on the notion between discrete and continuous representation of early math learning. “I took the practicum with [Professor Herbert] Ginsberg and later on with [Professor Bar-

bara] Tversky, as well as some meetings with Professor Robert Siegler [of Carnegie Mellon University]. I concluded that arithmetic was a discrete action, like when children use their fingers to iteratively count, versus a number line, where there is a continuation from zero to the number that you are estimating.”

“It was a struggle at first to get people to understand what I was interested in researching. After many iterations, and many semesters of narrowing down my focus, I reached a point when the faculty and my advisors could clearly ascertain what the focus of my research was about. What to call it? Mapping? It was about gestural congruency too.”



Continuous Numberline



Discrete Arithmetic

Eventually, Ayelet called it *gestural conceptual mapping*. This simply states that the gesture and visual representation has to be congruent with the concept being learned. Of course, another factor that can make developing dissertations more arduous, especially in education, is making a cognitive or perceptual phenomenon relevant to teaching and learning. “My work focused on basic arithmetic operations of addition and subtraction as well as numerical estimation using number lines. The arithmetic task I developed myself, but the numberline task was based on a long lineage of research (*see* Siegler, 2009). Also, Professor Ginsberg was integral in helping me in the doctoral process.”



Developing the game took many months and spanned many different versions, rounds of beta testing, honing the visual depictions of these tasks, developing the gestures, testing and so on.. User experience and usability are often overlooked in the development of research like this. “In the first version of the numberline, the child could only drag or click on the line once; I found that kids found this very difficult. Other parameters like the thickness of the line, whether or not there are hash marks, and many other things like that that actually differentiate usability testing from pilot testing and both processes are integral to developing good research and good products.”

Once the game was born, albeit in its early stages, Ayelet and her team began testing in two schools in Harlem. Although the environment was not always ideal, they were able to collect data from August through October of 2010, tested approximately 150 kids (109 subjects for the final analysis). There were large knowledge gaps among the children. Some kids knew a lot and some very little. Few of them had a “middle of the road” amount of knowledge. Once Ayelet had her data, she worked with Measurement student, Sonia Gugga, who helped her formulate her data analysis. The experiment was a between subjects 2x2 ANOVA. The dependent measures were *time on task* and *percent accuracy*. The independent variables were *direct (touch)* vs. *indirect (mouse)* interface and the other IV was *congruent vs. incongruent gestures*.

Fortunately, all of Ayelet’s main results were statistically significant. First, she found that children using gestural conceptual mapping had significantly higher percent correct than children who did not use congruent gestures. Second, children who used direct touch spend less time on task than those who used a sec-

ond order (indirect) interface. Third, testers recorded children’s strategies and found that those who used direct touch employed more advanced strategies (called “count on”) significantly more than the students using mice.

Ayelet speculates that this is related to working memory load (*see* Baddeley et al., Cohen et al., Sweller et al.). She hypothesizes that the direct touch allows for the learners to more directly map the concepts and promotes a flow of usability. To that, she warns that it is often difficult to distinguish usability from the impact of the content in the game and that further investigation is needed. Regarding the time on task, it is crucial, it means that children can see and solve more problems on a touch-based interface than a mouse-based, which could have big implications for developing educational technology going forward. Ninety-eight percent of the children were fully engaged in the games during here data collection. They enjoyed the games and wanted to play more. None of the kids asked to stop.

“This finding was really surprising, cause I expected at least some of them to ask to stop, but none of them did! This speaks to the

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5	7	3	9	4	1	2	8	6

point that when you integrate education and entertainment, it has to done well.”

Ayelet presented her pilot work at the 2010 APS Conference as a poster in Boston and then at the Human Computer Interaction (HCI) conference in Atlanta Georgia in the SMART workgroup as a paper. Next, she presented at the Psychonomic Society Conference in November 2010 in St. Louis and finally here in New York City at Fordham University’s Subway Summit in February of 2011. She will also be presenting in Spring of 2012 at AERA as a part of the Embodiment Panel organized by TC doctoral candidate, Cameron Fajdo. Ayelet also co-authored a book chapter with Professor John Black and a few other TC students on the theoretical foundation of learning environments.

Ayelet is pleased. “Only a few hours with this game seems to connect very well to kid’s conceptualizations of how numbers represent quantities. They seem to love the game and it teaches them core skills for mathematical understanding.”

Ayelet Segal lives happily with her family here on the Upper West Side in Manhattan and is the founder of and chief Ph.D. at *iGeneration.com*.



Ken-Ken!

In each thick-line “block”, the target number in the top left-hand corner is calculated from the digits in all the cells in the “block”, using addition (+), subtraction (-), or multiplication (x) as indicated by the symbol by the target number. All the digits 1 to 4 must appear in every row and column.

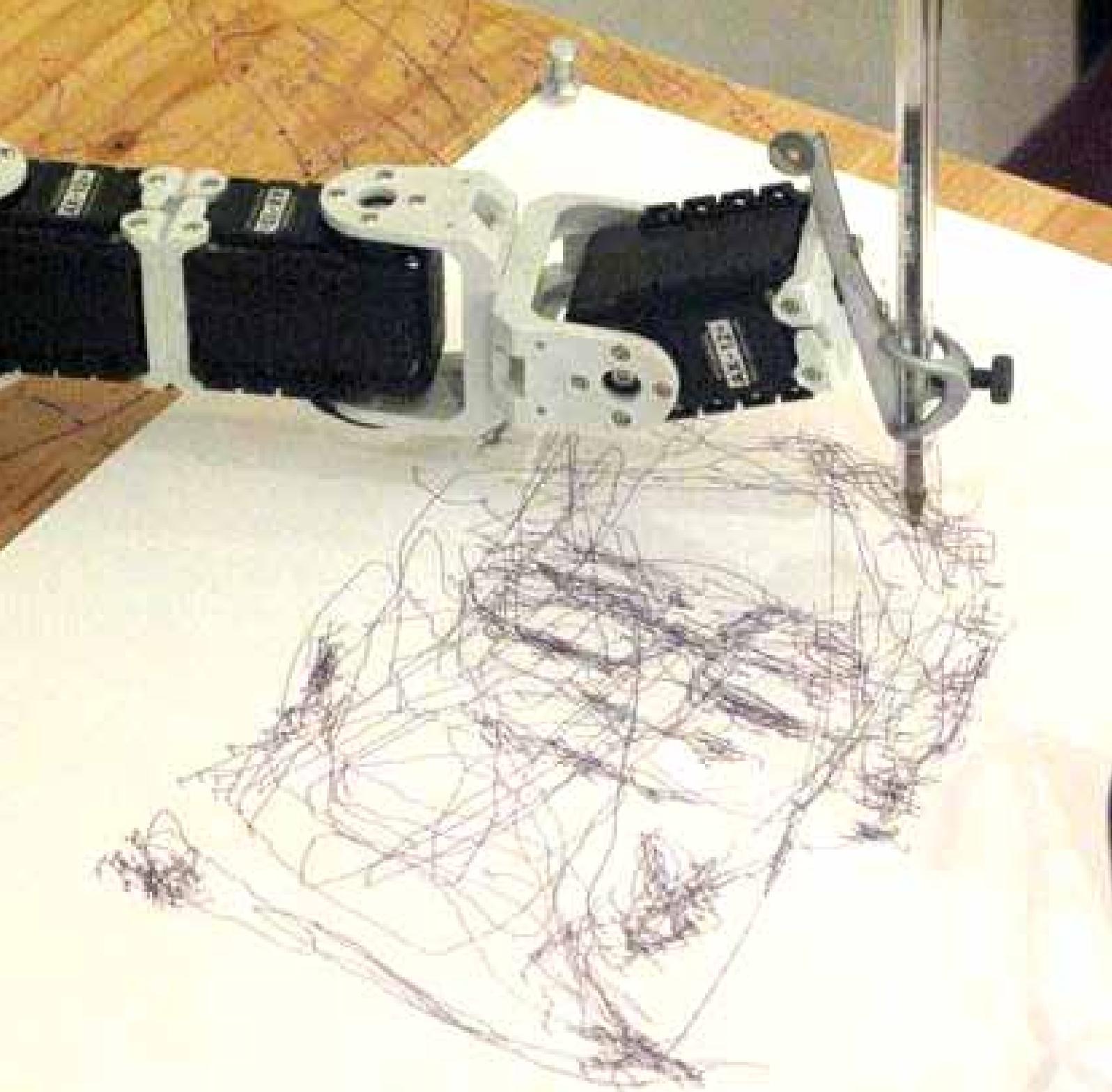
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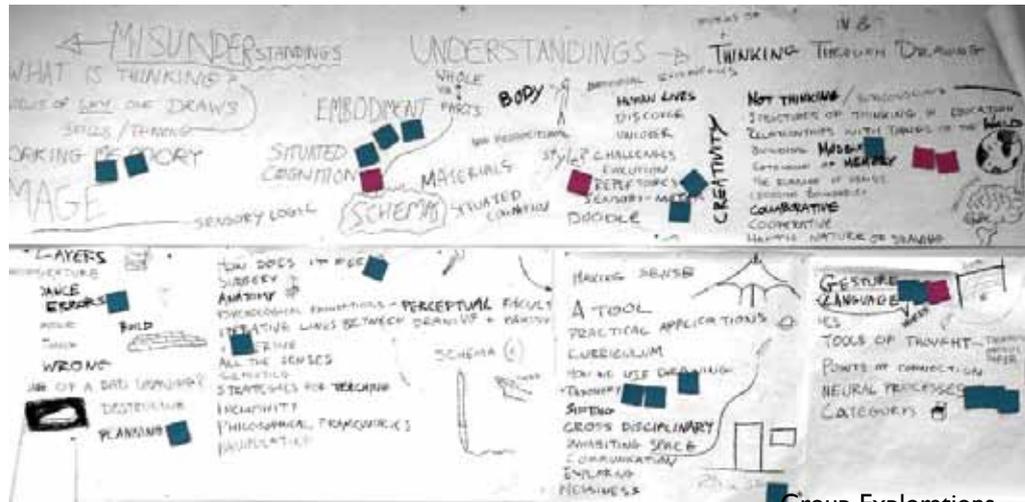
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DRAWING

Over the last weekend in October, Teachers College hosted the first “Thinking through Drawing” conference, an interdisciplinary symposium on drawing, cognition and education. The conference was born out of a spring meeting in London between TC student Andrea Kantowitz, and two other researchers, Angela Brew of the University of Sydney and Michelle Fava from Loughborough University School of the Art. HUDN sat down with Andrea to talk about the very successful conference this fall.

Andrea is a doctoral student in the Art & Education program in the Department of Arts & Humanities. She is collaborating with HUD’s Professor Barbara Tversky and their work focuses on how the creation of Studio Art can enhance our relationship between our perception and cognition.

“We came together in England this past spring and recognized that we had these kindred interests and wanted to understand these merging fields more deeply and use these insights into our respective doctoral works on the



Group Explorations

associated cognitive processes. I am specifically looking at the interaction between the situated cognition [see Gibson, 1986] and embodied cognition [see Barsalou, 2007] as well as expertise

et cetera, and wouldn't it be really great to get them all in one room together.”

“The conference,” according to Andrea, “was about finding ways to illuminate expert practices that

“Drawing is such a simple way to address so many questions: the simplicity of making a mark on a surface, being bodily involved is such a basic thing and yet such fertile ground for investigating how we learn and how we understand the world around us.”

[see Ericsson, 1996] across domains. Within drawing research, we are really interested in particular findings in cognitive research. We were all really interested in Barbara’s work [see Tversky, 2011], Kozbell’s work at Brooklyn College, David Kirsh’s work at Stanford [see Kirsh, 2011],

can be transferred or utilized in the classroom. Drawing is one of the most basic and universal things that humans do. We draw before we read or write. That is why drawing became the focus of our work. It is so complex cognitively and yet so basic. We’re coming from a contemporary art world, but not just looking at art and architecture, but also the accompanying fields that like engineering and math that utilize many of these conventions to explore, create and invent.”





domain of embodied cognition.

Group Explorations

As a practicing artist for many years, I have always been interested in interdisciplinary studies. In my undergrad [at Harvard], I created an interdisciplinary degree of Art and Cognition,” Andrea explained.

“Since then, the domain of Cognitive Science has blossomed in ways that many of us didn’t imagine. There is a lot of excitement about the role of brain science; people are really interested in it; but there are a lot of misconcep-

Artists always enjoy getting their hands dirty- I certainly do. Looking at studio art as a subject for doctoral study allows us to make stuff while pursuing important questions under the rigor of an academic research environment.”

The conference extended over three days. The first two days were group meetings amongst leading practitioners and researchers and the third day was a day of presentations and panel discussions on a wide array of topics. “On Friday, we got the panels together and brainstormed the question, “What does thinking through drawing mean to you.” Out of that emerged a rich set of topics for discussion, ideation and research. Originally, the pre-emptive brain storming was to iron out any kinks for the main day of the conference on Saturday, but it turned out to be a treasure trove meeting of the minds.”

Saturday’s topics ranged from Professor Tversky’s keynote en-

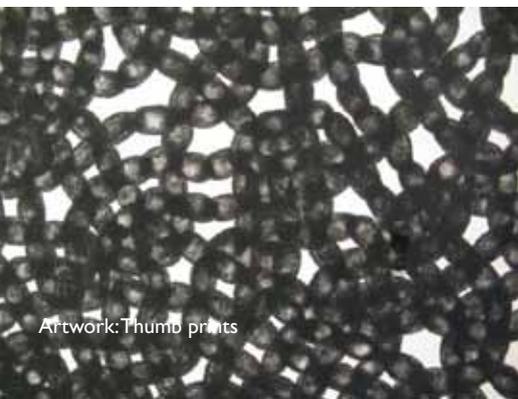
titled ‘Tools of Thought‘ in which she surveyed a large breadth of her and her colleagues works that investigated the ways we-construct our thinking to Aaron Kozbelt’s lecture entitled, “All in the timing.” In it, he invoked embryological principles to understand creative thinking in art. Ruben Coen-Cagli’s presentation on the *Visuomotor Atoms of Copy-Drawing* used corroborating eye-tracking data and another featured Jenny Wright’s collaboration with surgeon Neil Shawl on the role of drawing in surgery.



Drawing in Surgery

The picture of the robotic drawer comes from the work of Frederic Fol Leymarie and Patrick Tresset. These collaborators stimulated good conversation and questions on their work using computational modeling and robotics to understand the sketching activity (see page 17 in this issue). There were many more great presentations; for a complete list of all the great speakers, go to:

<http://drawingandcognition.pressible.org/schedule>.



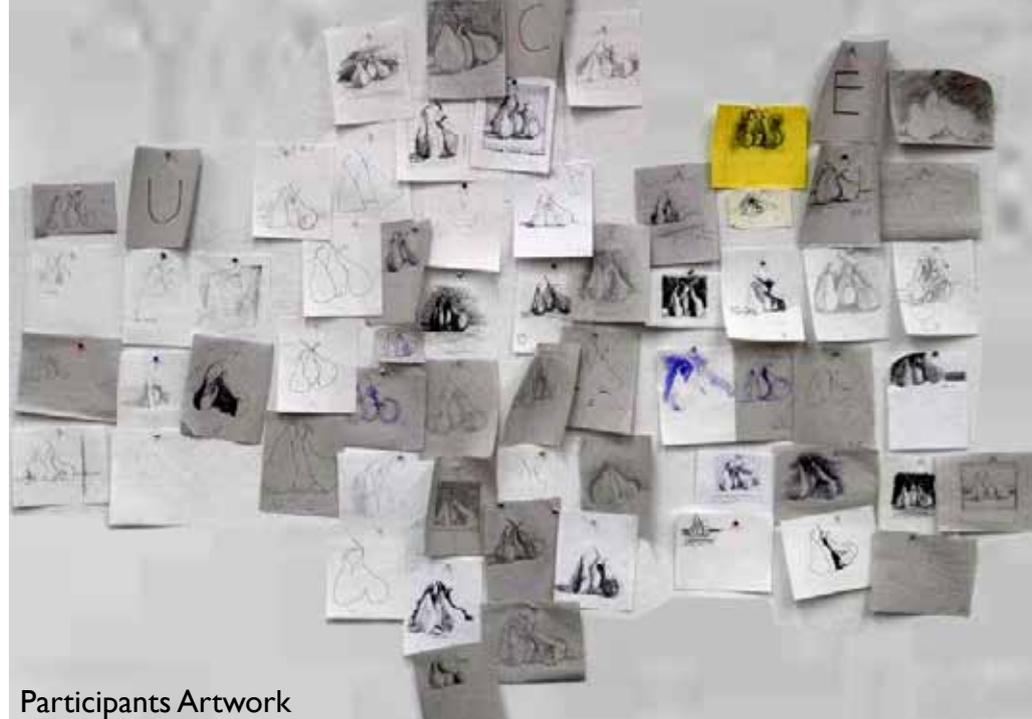
Artwork: Thumb prints

tions about it. Coming back to school has been an opportunity for me to pursue new breakthroughs, especially in the sub-



“In education, there are often these stereotypes that artists are creative and expressive but not necessarily rational and logical while scientists are the opposite. These stereotypes can be destructive ‘cause they can eschew individuals into thinking that there are limitations on their own capacities and their abilities to contribute. Many of the artists were impressed by the scientist ability to be imaginative while the scientists were impressed with how many of the artists approach regiment and utilize control in their experimentation,” Andrea reflected. “It seemed at first like the assortment of professionals that we had assembled didn’t have a lot in common, but on the day of the conference, we learned that we were far more connected than removed from one another.”

“Our original idea was to get like 30 people in a room together with a few speakers. We weren’t prepared for the outpour of speakers who responded favorably for our requests to come to the conference. Overall, people really seemed to enjoy the conference. Nobody stopped talking. Attendees from all different backgrounds were engaged in lively dialogues, sharing knowledge, experience with one another. We created a mailing list and many of the people that attended the conference



Participants Artwork

are staying in touch with one another and starting collaborations on new projects. We were like academic matchmakers in a way.”

In the meantime, Andrea and her cohorts are busy compiling the proceedings from the conference. “To have seen the presentations and then to see the papers as they come in is such a wonderful mix of subjective first person narratives by artists of their own processes alternating with these very scientific method statistically validated eye tracking studies and things of that sort.”

“And I think that this is where education is going. The world has become too complex. It doesn’t make sense to segment domains the way they once were. Kids are learning information that requires a more robust understand-



Artist: Tara Geer



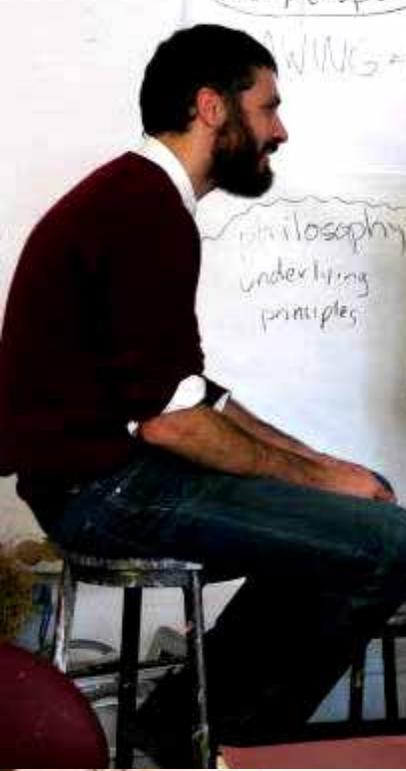
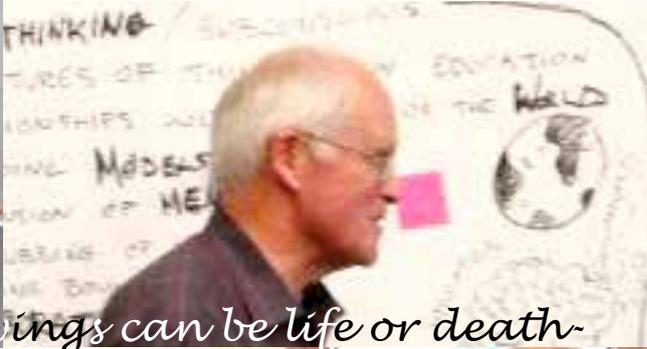
Artist: Margaret Neill

ing of the relationships between domains. These are the big questions that a conference like this bring attention to and open up for discussions into the future.”





"Drawings can be life or death"



Territorial maps can mean the difference between trespassing under penalty or safety and protection.



In surgery, drawing is a skill that can differentiate between a successful or unsuccessful procedure.



Examples of how we map our world, our experiences - taking action.



"That's what really matters?" AK - :>)





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CLOTHING DRIVE

PAGE 22

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OCCUPY EDUCATION

If we

Perspective by Blake Victor Seidenshaw

accept the world
as the playground,
sometimes battlefield,
of poisons,
history becomes a story
of shamanic alliance and conflict,
a study of magic spells
and their dissolution by new spells.

It's not a question of
drawing the contours,
but of what escapes the contour,
the secret movement,
the breaking,
the torment,
the unexpected.¹

We can say that all governments
are in the business of enchantment,
to keep the sacrificial victims from
rising up and overthrowing those
who sacrifice and eat them.

Armed force is never absent,
but even when most prominent certain equations ensure its vulnerability.
Along with terror, hegemony depends upon myth and sorcery.²

The kind of knowledge required
to make political and moral choices
cannot be derived from
a priori forms or changeless principles;
it must be drawn empirically from
an historical process which is always changing,
and applied pragmatically
in given situations as they arise.³

EDUCOGNOSIS

When we write, we weave worlds around ourselves, as we weave ourselves around words, and through them. Our practice – I mean this one, reading/writing- is a strange one; patient and calm, it demands not only attention but literally failure: the failure to capture what is intended, what one means to say, and who, incidentally, means it. The practice of writing is just one of the many things that we do these days, and today it seems so simple, so obvious, as to be nearly insignificant. But can you see that this practice, this weaving of *texts*, structures not only our lives now, when everything we do is *mediated* by texts and their traces, communiques and appointments, data and its vehicles, but always. Did we become what we are, a species living together, a unique being, but one separated from all others because of that uniqueness? Will we realize, finally, that we are not so unique, not so special, only when the last of our rivers and lakes have been poisoned, our mountains and valleys razed, and our co-inhabitants imprisoned and tortured, starved and excommunicated, killed?

The strange place occupied by education today is one that is central to both: wars and their resisters; conservers and transformers; mechanisms of exchange and

their hacker-engineers; our diseases and their cures... Education is truly a *pharmakon*, in the ancient Greek sense; a *poisonous medicine*. We can do neither with nor without it. This intrinsic ambivalence demands appropriately subtle strategies; this is where the real work lies for teachers and students, parents and children, administrators and occupiers of our damaged and imperfect institutions alike.

INTERDISCIPLINARY PHILOSOPHY

I've come to the study of education from a peculiar angle. My scholarly training has been varied; my engagement with particular disciplinary techniques and languages is more broad than deep. I have studied in the human and natural sciences, mathematics and music, history and poetry, political and cultural criticism. I'll be frank: my reluctance to commit to more specialized degrees of formal training in these fields has been driven by an intuition that each relies far more on insights taken for granted from the others than it tends readily to admit, such that each discipline's arguments make use of assumptions supplied by its neighboring discipline (creating a *cascade* arrangement whose form is ultimately circular, but whose *practice* spirals). This insight -that a radical potential for indeterminacy hides within and among

our most basic assumptions- sours the prospects of disciplinary learning considerably. Who's to say if what you've been taught (and more importantly, *how* you've been taught to *learn*) will be relevant when you are called upon to apply it? This irreducible uncertainty calls the ethical bases of our social and cultural traditions quite radically into question.

My suspicions about this have repeatedly been confirmed over the course of my studies: the limits of reasonability experienced *within* each disciplinary tradition seem to bear a strong degree of formal similarity *across* disciplines. These "limit-forms" could perhaps be called "para-methodological", since they are not usually contained in the doctrinal contents explicitly upheld by a discipline's adherents, but are rather found encoded *implicitly* in the *forms* of the techniques and practices on the bases of which these doctrines are meant to be *properly* engaged.

Today we have the *privilege* – as much as the misfortune – of being able to see more clearly than ever before the wide array of methods, practices, and lifestyles which have been thrown together in the massive vortex of globalization. These complex conditions bring with them an intense responsibility: we are compelled to *strive* toward understandings of *all* of these func-

1. Helene Cixous, *Stigmata*.

2. Dale Pendell, *Pharmakognosis*.

3. Eric Havelock, *The Liberal Temper in Greek Politics*.



tions, beliefs, traditions, histories; because not only are they alternate, equivalent perspectives on the *same* world, they are also *coexistents* in this world – just as they often and increasingly now coexist in *us* – and their interactions have consequences (just as ours do).

This imperative is in the process of seizing all of us, regardless of whether we choose recognize it or not. Even the most entrenched adherents of traditional practices, worldviews, and orthodoxies have found themselves – often right along with their insular communities – swept up into this maelstrom of socio-technological complexity. From aboriginal peoples and religious communities to the technicians and engineers working with the many complex mechanisms over which we have claimed influence, this overarching trend has begun to throw many formerly – unquestioned assumptions into a radical state of uncertainty. As highly-skilled specialists in any field know well, even simple acts can yield radically different effects depending on the context in which they are applied. Today this uncertainty has infiltrated even the simplest daily tasks, so reliant have we become on complex mechanisms of production, trade, communication, and etc., and looms over us as an implicit and unanswerable question: what effects do I and my practices have on others and their practices? The intractability of this simple question follows from the unprecedentedly high degree of practical specialization afforded by contemporary educational and professional apparatus. It has become extremely difficult to understand the effects of disciplinary practices in any other terms than those developed specifically within the communities of their practitioners.

Perhaps this difficulty goes some of the way towards explaining the increasingly-exclusive use of *economic* modes of explanation in the sectors of educational policy and administration. The “bottom-line” economic rationality characteristic of the so-called “neoliberal” tradition appears to have successfully avoided the polemics and entrenchment characteristic of disputes among more “holistic” doctrinaires of various castes and creeds, while allowing schools, businesses, and governments to continue operating (provided they capitulate to the demands of their shareholders). Money has bypassed politics, and this short-cut has had a gradually devastating effect on our democratic institutions and aspirations.

ECONOMICS OF OCCUPATION

MacKenzie Wark recently published a short essay in the online journal *Theory and Event* about the popular movement known as “Occupy Wall Street” (OWS). The essay is titled, *This Sh*t is F*cked Up and Bullsh*t*, after the message on a sign carried by one of the protesters. In the essay, Wark presents a case for interpreting the movement as a complex extension of Situationism, the radical form of “Cultural Marxism” that helped to instigate the now-fabled events of May ‘68 in France. Wark argues that in keeping with Situationist thought, the OWS movement has successfully intervened at a critical point existing alongside the still-important traditional objectives of finance and labor reform:

The third component to analysis then, alongside work and debt, is the struggle over the means of inventing and communicating, a struggle over knowledge, culture

*and science, over the “general intellect” if you like. Only it is not just about “intellect” as ideas in people’s heads. It is about the form of the relations which mesh human and machine intelligence together. It is not just about ownership and control of these means, although that is crucial. It is about the design of these very means themselves. Or sometimes the redesign. The people hack tech, but not with the tools of their own choosing.*⁴

Wark draws our attention to how what aesthetic, subjective phenomena like intelligence and creativity interfere with the strictly objective, economic factors of production and consumption; complicating their dialectic, bending their cyclic dance so that it spirals into novelty. “Tech” is hacked by *people*; and this “struggle over the means of inventing and communicating” can be given the form of a question: who gets to decide “the form of the relations that mesh human and machine intelligence”? Who gets to decide what forms of interaction will determine the relationships between local and global, micro and macro processes?

Wark connects these theoretical questions – how to weave that mesh of *logos* and *techne*- with the problems of *education* and *economy*, suggesting that “student debt [...] is perhaps the next big crisis after housing debt, and as powerful a motivation as the debt and bankruptcy forced upon people by medical expenses in the United States.” Education now replaces housing as the key growth sector in a now-global economy with massive structural instabilities. That this situation is unlikely to support the optimistic projections of hopeful borrowers is likely an understatement.⁵ As Wark rather blandly puts it,

4. MacKenzie Wark, “Th*s Sh*t *s F*ck*d Up *nd B*llsh*t.” *Theory and Event*. 14:4, 2011. <http://muse.jhu.edu/journals/theory_and_event/v014/14.4S.wark.html>

5. cf. Christian Deritis, “Student Lending’s Failing Grade.” *Moody’s Analytics Regional Financial Review*, July 2011 <<http://www.insidehighered.com/quicktakes/2011/08/02/moodys-offers-pessimistic-outlook-student-borrowers>>.

“Trying to get a piece of the ‘knowledge economy’ through study is just not a sure thing anymore.”

But there’s a deeper problem at work in this concept of the “knowledge economy” than the disappointment of bourgeois expectations. If we’ve followed Wark’s argument, the analogy with traditional economic sectors can’t work for the simple reason that “industrial” exchange-mechanisms govern the passage of various definite and prespecified commodity – objects between and among producers and consumers, whereas those governing the production and consumption of those rather intangible commodities we call “knowledge” –and perhaps we can call *these* exchange-mechanisms ‘informatic’- would operate at a level of relative abstraction. The basic terms (productive and consumptive) of “informatic” exchange thus become, respectively, the *transformation* and the *maintenance* of their constitutive ‘industrial’ exchange-mechanism arrays.

This formulation leads directly to two basic corollaries. First, the so-called “knowledge economy” is irreducible to the production, distribution, and consumption of prespecifiably, marketable goods; papers, books, schools, lectures, software applications, and etc. To the extent of this prespecification – the determination of these products at the level of their *formal* specificities- their reproduction would only contribute to the *maintenance* of existing forms of exchange. The domination of society by the *maintenance* of exchange-mechanisms can now be understood as overreliance on intellectual *consumption* and a consequent lack of the intellectual *production* that would manifest as the *transformation* of exchange-mechanism.

Participating in existing economies can thus be seen to presuppose our capitulation to the dominant forms of exchange through which it reproduces itself. Experience and experimentation⁶ come to be burdened with some -if not all- of the heavy responsibility for the *transformation* of knowledge-economic mechanisms; *the inseparably creative and communicative development of new forms of ex-*

change. For Wark, paraphrasing the Situationists, this means that we “cannot take it for granted that there is axiomatically a “politics”. Its very possibility has to be invented.” But how?

The second corollary is that the traditional relationships between experiences and their explanations undergo a marked reversal, which can in turn take two possible forms. The first recapitulates a standard Marxist trope: revolutionary praxis frees the consciousness of the worker from the alienating influence of Althusser’s Ideological State Apparatuses⁷, and thereby subordinates academic theory to revolutionary praxis. Wark’s call to the OWS movement to avoid the “Leninist fantasy of ‘leading’ a movement” takes up this curiously Hegelian stance, arguing that “If a theory is any good, it provides a language for what the movement already knows.”

In this version of Marxist praxis, theory provides language for grappling *in retrospect* with the already-constituted fact of revolution. Intellectual production – intelligence in its *transformative* aspect – must therefore exist in the first place as an embodied exploration of emergent patterns of behavior, interaction, and communication, and only in the second as crystalline theoretical language. Theory, by this logic, can only exist on the condition that an already-constituted revolutionary community (“The 99%”) forms a market for its exchange and consumption. This way of parsing the reversal has been unable, historically, to make use of already-existing forms, or to understand the complicity between (intellectual) production and consumption.

We can unpack a second form of this reversal from the work of Gilles Deleuze, who suggested the possibility of “experiencing a new relationship between theory and practice.” Whereas the prior arrangement had been understood “in terms of a process of totalization,” the new relationship would be “much more partial and fragmentary. [...] Practice is a set of relays from one theoretical point to another, and theory is a relay from one practice to another.”⁸ Years later, mourning the untimely

death of his friend, Deleuze will write that:

*Truth offers itself to knowledge only through a series of “problematizations” [...] created only on the basis of “practices”, practices of seeing and speaking. These practices, the process and the method, constitute the procedures for truth, “a history of truth”. But these two halves of truth must enter into a relation, problematically, at the very moment when the problem of truth denies any possible correspondence or conformity between them.*⁹

Perhaps these *halves of truth* – what is perceivable and what is articulable, for Deleuze and Foucault – are like the two economic modes that we unpacked in the discussion of Wark and the “knowledge economy”. If so, then their “problematic relation” is one of reciprocal *affect*; the indirect but continuous transformative influence that governs morphogenesis and natural selection...

WINTER'S SPRING

Our generation’s revolution is not over; rather, it is just beginning. Occupiers everywhere, having seen the possibility of change, are settling in for a long winter, and we can expect things to Spring into action at the first sign of warmer weather. In the meantime, blessed by another long, uncomfortable East Coast winter, we should have plenty of time to reflect on our experiences over the past year. As workers in the “knowledge economy” – teachers, students, parents, administrators – we at Teachers College might reflect on the meta-economic consideration that the efficacy of our theoretical considerations can be dulled by our own often skewed ideas of our priorities; the order of importance in the complicated mix of duties, desires, and opportunities that fill our lives with meaning and care. Some questions of particular relevance that we might ask ourselves could include:

- (a) What am I studying, and why?
- (b) Am I happy with the course of study

6 The French word *expérience*, incidentally, carries both these senses.

7 For which, for Althusser, the school is both practical locus and paradigmatic example. Louis Althusser, “Ideology and Ideological State Apparatuses.” Pp.142-177 in *Lenin and Philosophy*. New York: Monthly Review Press, 1971.

8 Gilles Deleuze and Michel Foucault, “Intellectuals and Power” in *Bouchard* (ed.) (1977), p.205-207.

9 Gilles Deleuze, Sean Hand (trans.), *Foucault*. Minneapolis: University of Minnesota Press, 1988 [1986], p.64.

1	6	4	3	5	2
6	3	2	5	4	1
3	5	1	2	6	4
2	1	5	4	3	6
4	2	3	6	1	5
5	4	6	1	2	3

that I've chosen to apply myself to?
Why or why not?

(c) Is there something I'm passionate about doing, but can't seem to find the time for? What's preventing me from pursuing it?

(d) Are there things in my life that could be changed for the better? What's keeping me from making these changes?

I raise these questions because it seems to me that the future is just going to get crazier, to put it bluntly. And in crazy times, it's nice to know where the plumb lines are. As we get ready for a crazy summer of 2012 in the USA, here are a few suggestions to help us stay cool and calm.

(a) In unstable times, the best guarantees of success are versatility and adaptability. These are the proper fruits of a well-rounded education, and we are fortunate to have access to them. Knowledge is overrated; let's not sell ourselves short on well-intentioned advice, but dare to strive for what's best for *us*. Dare to Err!

(b) Solid friendships are worth more than paper certifications and fancy material possessions. Let's keep our eyes out for the good ones, and remember to treat others with respect, no matter how wild or weird things seem to be getting. What we put out often determines what will come back at us.

(c) Let's remember to take care of *ourselves*. Nothing we try to accomplish in the world will turn out the way we want it to if we can't be honest with ourselves and comfortable in our own skins. If something's the matter, we don't just put it off; we address it. And let's remember to eat well, exercise, and get regular sleep.

While we're plotting to occupy the world, let's not forget to occupy ourselves. *Errare Aude!*

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Join the discussion at:
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