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# Communication Design Quarterly

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# Communication Design Quarterly

ACM SIGDOC (Special Interest Group Design of Communication) seeks to be the premier information source for industry, management, and academia in the multidisciplinary field of the design and communication of information. It contains a mix of peer-reviewed articles, columns, experience reports, and brief summaries of interesting research results. *Communication Design Quarterly* (CDQ) is archived in the ACM Digital Library.

We invite you to contribute in any of the following areas:

- Peer-reviewed articles. Articles that cross discipline boundaries as they focus on the effective and efficient methods of designing and communicating information; disciplines will include technical communication, information design, information architecture, interaction design, and human-computer interaction.
- Experience reports. Experience reports present project- or workplace-focused summaries of important technologies, techniques, or product processes.
- Interesting research results. Short reports on interesting research or usability results that lack the rigor for a full article. For example, pilot studies, graduate student projects, or corporate usability studies where full details can't be released.

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### *CDQ Editors*

# CDQ editorial


## Michael Albers

**Editor:** ***Communication Design Quarterly***
***albersm@ecu.edu***


With this issue, SIGDOC president Liza Potts is stepping down as a co-editor of CDQ. Something about balancing workload and wanting to sleep. About two years ago, Liza and I spent a lot time on Skype talking about how to refocus CDQ into a journal-quality publication and how to accomplish that task. I think it's nicely on track. Best wishes to Liza and she shifts her SIGDOC responsibilities fully toward being president and running the organization.

This month we have three columns from Jason Swarts, Claire Lauer, and Rebekka Anderson. I've lined up several other columnists and they will each by writing about two columns a year, one every other issue. This both spreads out the writing work and allows CDQ to publish a wider range of columns. Each column will focus on a general topic of the author's choice and will allow you to enjoy a wide range of views and ideas from across the field of communication design.

The two feature articles this month are both expanded poster papers from this year's SIGDOC conference. For the conference, papers were limited to 2 pages, while here the authors could write as long as they desired. It provides a deeper discussion of the work behind the poster and both provide a great examples of the work SIGDOC showcases.

And finally, we have reviews of three books.

Hope you enjoy.

# Notes from the Chair


## Liza Potts

**SIGDOC chair**
**lpotts@msu.edu**


Welcome to our new issue of CDQ! We hope you enjoy the columns and articles, and we encourage you to submit your work.

I am delighted to let you know that we have a new Communications Manager, Michael Trice. Michael is a lecturer at MIT, where he teaches classes on writing and usability. He also worked in industry before coming to academia, most notably at Apple. We are looking forward to his leadership, built on the content strategy that Giuseppe Getto started for us. Michael will be launching a new strategy soon with help from Dawn Armfeld, and we will need all of your assistance as we work to share SIGDOC's research across our fields.

And a hearty welcome to new board members Courtney Griffin and Beth Keller! Courtney is a learning technologist working in Chicago, where she has founded multiple organizations focused on young women of color and healthcare communication issues. She just completed her MA in professional and technical writing at DePaul, and I am thrilled to have her energy and enthusiasm on our board. Equally awesome is Beth Keller, a PhD candidate at Michigan State University who is writing her dissertation on women, professionalization, and mentorship. She is coming with great ideas on how we can better work to support each other as researchers and practitioners. Please feel free to reach out to them with your ideas.

As we make our way through the first part of 2014, we are starting to ramp up on several initiatives for our SIG. And we need your help! Below is a selection of the top projects we are working on. The overall theme continues to be broadening our membership and working across organizations. Please feel free to contact any of your board members to get involved.

## SIGDOC 2014

We are excited to announce that this year we will be working with the Council for Programs in Scientific and Technical Communication (CPTSC) to locate our conferences together in Colorado Springs, Colorado this September. As part of our new mission to work better together, we are working with other organizations within technical and professional communication to collaborate, meet up, and network. This conference will provide the opportunity for our organizations to create shared space for members to network, chat, and learn form each other. As a supporter of both organizations, I am very excited to see this partnership come together. Check out our CFP in this issue for more information, and look for CPTSC's CFP soon.

## Membership and Diversity

We want to grow our membership and expand our mentoring programs, especially for early career academics and industry professionals. As part of this move, we will be sponsoring this year's Women in TechComm luncheon at ATTW's annual conference. In addition to yours truly, our SIGDOC representatives in attendance will be Kathie Gossett and our student representative Beth Keller, who is working on mentorship project for her dissertation research. Please feel free to reach out to any of us about this initiative. Your board is also putting together a special subcommittee to address these issues, so please feel free to ask about joining us.

## Student Awards

Part of growing our membership and becoming more diverse includes reaching out to students currently working on projects relevant to SIGDOC. Are your students working on compelling research projects? Did they work in a compelling internship that they can talk about? Please encourage them to submit a paper to SIGDOC '14. Please see the CFP for more information. And keep in mind that we are very interested in publishing student work in CDQ. Each issue holds at least one spot for student work, which

has a separate peer review track. Please contact our Developmental Editor, Kirk St.Amant for more information.

If any of these initiatives interest you, please feel free to contact us. And I would encourage you to continue to talk about SIGDOC with your field's major organizations. We are always looking for new ways to connect to birds of a feather organizations, broadening our understandings about the design of communication.

# The Mobile Situation


## Jason Swarts

**North Carolina State University**
**jswarts@gmail.com**

Written communication and its accumulated principles of applied design often serve conservative and preservationist goals. Literacy and its various, sprawling technological apparatuses of production and distribution preserve ideas and prepare them for uptake and adaptation. What is preserved in writing speaks with greater reliability over time and choices about design can influence the validity or appropriateness of those texts, by invoking proper voices and suggesting or demanding appropriate relationships between people and institutions organized around those texts. While this may seem an inhospitable way to open a column in a journal on communication design, my point is not intentionally disparaging. Instead it is to draw a contrast between types of communication design work: that which works to affiliate discourse with a location and practices of uptake and that which creates and works across those locations.

Focusing a bit more precisely, the issue critical to understanding the rhetorical influence of mobility is genre. With time, the stability of some contexts and rhetorical situations lead to the creation of genres from which we descriptively derive design recommendations. In so doing, genres acquire authority and potency, seeding the development of tools that support communication with those genres, in presumed rhetorical situations, embalmed by our technologies that insistently place these genres in front of us. Frequently, this relationship serves us well, for in our professional and social lives we encounter the same (or similar) rhetorical situations for which the form of communication we used last time is appropriate this time as well. It is the reason genres arise in the first place. To put the point less fatalistically, genres and the recommendations for their design imply a stasis or located-ness, where uptake is understood and anticipated, where the exigencies, the audiences, and the means are

understood and are relatively stable. Mobility, the subject of this column, defies this presupposition because one who is mobile lacks a place, a location, or a stable set of pre-conditions that can recommend an appropriate form of designed communication. Yet mobile communication relies heavily on consideration and effective control of design choices. So what is the challenge of thinking about design in a mobile context? As a start, it requires us to revisit the concept of a rhetorical situation to see how a lack of location potentially alters the work of design and communication.

Without attempting to resolve the Bitzer/Vatz debate over the determinacy or indeterminacy of the rhetorical situation, I propose to instead investigate and maintain the tension. Being mobile asks us to think of rhetorical situations as both stable and unstable, pre-existing and emergent, prescriptive and contingent. Yet we do not talk as often about the role of design in such a constitutive manner. Mobility provides this opportunity.

Starting with the classic components of a rhetorical situation (i.e., exigence, audience, constraints/means) we can see how mobile communication asks us to think about the occasions for discourse diachronically. Situations certainly evolve over time and reflect a history of habituated interaction, but they are also continually reassembled, as mobile users link together new actors, means, and motives that vary with the locations across which they travel or to which they have networked access. When location is multiple and unstable, exigence, audience, and constraints/means are not known quantities but are vectors with variations in scale, number, priority, and direction of change, that continually alter the circumstances of the rhetorical situation. The kind of rhetorical work that we seek to accomplish (whether persuasion, compulsion, coordination, etc.) varies by location, bringing different audiences to the fore, different means, different constraints, while perhaps keeping the exigencies the same. Or the change in location may keep the audiences the same, the means the same, but alter the reasons for interaction. In each situation, the rhetorical work is achieved through communication that is designed for those purposes and held in place by genres that impose a familiarity by presupposing a stable situation. But if alterations to any of these rhetorical vectors changes the situation, mobile communicators must be able to make

adjustments; instead of to the situation itself. Mobile users move, physically and virtuallythey link in new actors and means, to re-prioritize and create the situations in which desired rhetorical work can take place. Engaging in mobile communication is not simply one of understanding the situation and responding to it, but also one of constructing the situation that enable a particular kind of rhetorical work.

Synchronically, the story is different, because a cross-section of any rhetorical vector is a period of momentary stability and locatedness. In those moments and for those moments, the rhetorical situation can be described as organized around an exigence, aimed at persuading or moving an audience (whether of people or things) and doing so via a finite range of means, drawn from the way that mobile communicators and their devices can interact with a location and make it shareable. The challenge of mobile communication in the context of these rhetorical situations is that the variables of the situation can hardly be predicted and may require innovation from the mobile user about how to see an environment or location through a device and capture, convert, and reveal what is salient.

These concerns will be the ongoing focus of this column, which I will approach from the standpoint of workplace applications of mobile communication, the teaching of communication and message design for mobile contexts, the design of applications to support mobile communication, and the problems of doing research in these contexts. I invite your comments and suggestions.

# Toward a More Integrated View of Technical Communication


## Rebekka Andersen

**University of California, Davis**
**randersen@ucdavis.edu**

For the past few years, I have attended a number of industry conferences focused on content management (CM); reviewed a wealth of CM-focused publications, including trade books, white papers, newsletters, and blogs; and followed numerous CM-focused online discussions. Through these experiences and readings I have learned a great deal about the affordances and challenges of CM. But the message that has most impacted my thinking about CM—and what it means for the field of Technical Communication (TC)—is this: the era of document-based information development (ID), which has shaped all aspects of TC research, training, and practice since the field's inception, is coming to an end.

The era of topic-based ID, commonly referred to as CM, has arrived in full force. And this era is all about integration—that is, integration of organizational and user-generated content, disciplines and departments, expertise and roles, and business processes and tools. In a topic-based approach to ID, organizational content, from technical to marketing to training content, is created in the form of stand-alone topics rather than documents or books. These topics conform to predefined rules that ensure the topics are consistently structured and can be assembled into different information products (e.g., user guide or training module) rendered in different outputs (e.g., HTML or ePub) for different delivery channels (e.g., mobile phones or websites).

A key goal of topic-based ID is to enable organizations to meet consumer expectations for content in an increasingly mobile world. To do this, organizations are adopting strategies, processes, and technologies that allow them to create highly engineered, modular

content that is not limited to any "one purpose, technology, or output" (Rockley and Cooper, 2012, p. 52). Cross-disciplinary teams of strategists are identifying and analyzing customer-facing content across organizational units (e.g., technical publications, training, product support, marketing), architecting and modeling that content, and developing unified processes so that all involved in developing, storing, and publishing content do it in the same way, allowing for content to be effectively shared and combined in myriad ways (Andersen, 2014).

Given sweeping changes in the content industry, I reemphasize in this inaugural column on CM the pressing need for the field of TC to develop a framework for its work that centers on collaborating with other fields and achieving cross-disciplinary goals. Spilka (2009) first emphasized this need in her edited collection, *Digital Literacy for Technical Communication*, which called on technical communicators to focus more on how the field can evolve rather than how the field is going to survive. As Spilka noted, other fields are claiming a stake in the topic-based approach to ID; to thrive, she argued, our field must find ways to collaborate with these fields, to join together in achieving larger, cross-disciplinary goals (p. 4).

To get us thinking about what such a framework might look like, Spilka urged us to put aside traditional boundaries that have long distinguished our work from the work of other fields and instead focus on questions such as follows (p. 6, questions copied verbatim here):

- How can we adapt, adjust, and contribute?
- How can we help toward goals that are larger in scope than those we have worked on in the past?
- How can we contribute to the social good with our unique perspective, knowledge, and strategies?
- How can we join others in "adding value" and in making a difference?
- How can we show how we matter in the context of the larger social environment of our work and how can we help in broad, even global ways?

CM thought leaders, who widely agree that the field of TC needs a changed mindset, have begun talking about an integrated view of TC as one answer to Spilka's questions—as a new way of framing our work (Baker, 2012; Giordano & Martine, 2011; Gollner, 2011; Parker-Richards, 2012). A promising column in Tech Writer Today articulates what an Integrated Technical Communication (ITC) might look like. In the column's first article, Giordano and Martine (2011) define ITC as follows:

> *"Integrated technical communications (ITC*) is the coordination and integration of all technical communication processes, tools, functions, and sources within an organization to convey information and knowledge relevant to optimizing the users' product experience."*

This definition, the authors explain, "focuses on increasing the users' understanding and experience" rather than on researching and creating content, and it focuses on integration, which "leaves ample room to look for strategic coherence in our vision, planning, and execution of technical communication activities." Integration has been articulated by Gollner (2011) as the convergence of TC and business analysis. This convergence is critical to the success of an organization's content strategy, or the underlying framework that governs the production, management, and delivery of topic-based content.

In an interview with Giordano (2012) on the topic of ITC and the content revolution, Gollner proposed an Integrated Product Teams (IPT) model that integrates TC with all aspects of the product lifecycle. As key contributors, suggested Gollner, technical communicators can help the IPT "develop a knowledge base for the product … [that] informs not just the users activities but the product design itself." Gollner described the technical communicator as a "choreographer, curator, facilitator and community builder" who works "in concert with engineering and product marketing to manage [the] iterative refinement cycle more effectively." In the IPT model, the technical communicator becomes product insurance, keeping user needs and expectations in mind at all stages of product development, including the development and management of all product-related content.

Gollner's vision of the technical communicator's role on an IPT is not all that different from TC researcher articulations of TC as symbolic-analytic work, or knowledge-centered work that affords technical communicators meaningful agency in their organizations (Albers, 2005; Dicks, 2009; Faber & Johnson-Eilola, 2002; Hart-Davidson, 2009; Johnson-Eilola, 1996; Salvo & Rosinski, 2010; Slattery 2007). What his vision and the ITC framework offer beyond existing articulations, though, are concrete starting points for how the field can adapt to the massive changes taking place in the content industry. These starting points position technical communicators not as content creators but as strategic contributors to CM initiatives, a role that requires collaboration with cross-disciplinary teams and content strategy work throughout the product lifecycle.

But, as is too often the case, most technical communicators have not been trained to think like managers, business analysts, or content engineers, and they have little to no experience analyzing a large corpus of content and architecting and modeling that content for topic-based ID across the enterprise. Most technical communicators are thus ill-prepared to help orchestrate CM initiatives. Our academic programs, with few exceptions, have not kept pace with changes in the content industry (Gu & Pullman, 2008; McDaniel & Steward, 2011; Spilka, 2009) and are still training students for the era of document-based ID (see Meloncon & Henschel's telling survey of 185 undergraduate programs). Developing a new framework for TC education means, among other things, designing new curricula centered on vastly expanded rhetorical situations, situations that look very different from the document-based rhetorical situations that have long driven pedagogical approaches to TC (i.e., situations focused on the writer-audience-subject relationship).

A first important step toward developing this framework is to conduct research that helps us understand what these expanded rhetorical situations entail and what skills, people, resources, and tools should be integrated to effectively assess these situations and develop and implement appropriate solutions. A second important step is to actively engage with and learn from CM thought leaders and other fields that are largely defining and shaping the CM

discourse, including best practices that organizations are widely adopting. The more our field is able to collaborate and integrate with other fields that have a stake in CM, the more our field's unique perspectives, knowledge, and strategies will be recognized for the value they add to the CM discourse. It stands to reason, too, that graduates of our academic programs will be more prepared to assume leadership positions in CM contexts.

In this bi-annual column on CM, I have as a goal to follow Spilka's advice to put aside traditional boundaries that distinguish the work of TC from the work of other fields and to explore questions, ideas, and practices that focus on a more integrated view of TC.

## References


Albers, M. J. (2005). The future of technical communication: Introduction to special issue. *Technical Communication, 52*, 267-272.

Andersen, R. (2014). Rhetorical work in the age of content management: Implications for the field of technical communication. *Journal of Business and Technical Communication, 28,* 1-43. (published online December 31, 2013)

Baker, M. (2012, July 3). It's time for a new doctrine of technical communications. *TechWhirl Magazine*. Retrieved from http://techwhirl.com/its-time-for-a-new-doctrine-of-technical-communications/

Dicks, S. (2009). The effects of digital literacy on the nature of technical communication work. In R. Spilka (Ed.), *Digital literacy for technical communication: 21st century theory and practice* (pp. 51-82). New York: Routledge.

Faber, B., & Johnson-Eilola, J. (2002). Migrations: Strategic thinking about the future. In B. Mirel & R. Spilka (Eds.), *Reshaping technical communication: New directions and challenges for the 21st century* (pp. 135-148). Mahwah, NJ: Erlbaum.

Giordano, C. (2012). Integrated technical communications & the content revolution: An interview with Joe Gollner. *TechWhirl Magazine*. Retrieved from http://techwhirl.com/integrated-technical-communications-the-content-revolution/

Giordano, C., & A. Martine. (2011). Integrated technical communications: A strategy for technical communicators. *TechWhirl Magazine*. Retrieved from http://techwhirl.com/integrated-technical-communications-strategy-for-technical-communicators/

Gollner, J. (2011). Intelligent content in the green dessert [Web log message]. Retrieved from http://www.gollner.ca/2011/03/intelligent-content-in-the-green-desert.html

Gu, B., & Pullman, G. (2008). Mapping out the key parameters of content management. In G. Pullman & B. Gu (Eds.), *Content management: Bridging the gap between theory and practice* (pp. 1-12). Amityville, NY: Baywood.

Hart-Davidson, W. (2009). Content management: Beyond single-sourcing. In R. Spilka (Ed.), *Digital literacy for technical communication: 21st century theory and practice* (pp. 128-144). New York: Routledge.

Johnson-Eilola, J. (1996). Relocating the value of work: Technical communication in a post-industrial age. *Technical Communication Quarterly, 5*, 245-270.

McDaniel, R., & Steward, S. (2011). Technical communication pedagogy and the broadband divide: Academic and industrial perspectives. In A.P. Lamberti & A.R. Richards (Eds.), *Complex worlds: Digital culture, rhetoric, and professional communication* (pp. 195-212). Amityville, NY: Baywood Press.

Meloncon, L. & Henschel, S. (2013). Current state of U.S. undergraduate degree programs in technical and professional communication. *Technical Communication*, 60, 45-64.

Parker-Richards, A. (2012, July 23). Integrated technical communications: A map to better understanding. *TechWhirl Magazine*. Retrieved from http://techwhirl.com/integrated-technical-communications-a-map-to-better-understanding/

Rockley, A., & Cooper, C. (2012). *Managing enterprise content: A unified content strategy* (2nd ed.). Indianapolis, IN: New Riders.

Salvo, M., & Rosinski, P. (2009). Information design: From authoring text to architecting virtual space. In R. Spilka (Ed.), *Digital literacy for technical communication: 21st century theory and practice* (pp. 103-127). New York: Routledge.

Slattery, S. (2007). Undistributing work through writing: How technical writers manage texts in complex information environments. *Technical Communication Quarterly, 16*, 311-325.

Spilka, R. (2009). Introduction. In R. Spilka (Ed.), *Digital literacy for technical communication:21st century theory and practice* (pp. 1-18). New York: Routledge.

# Technology and communication design: Crossroads and compromises


## Claire Lauer

**Arizona State University**
**claire.lauer@asu.edu**

As I prepare to teach the latest iteration of my course in Visualizing Information, I am struck by how quickly visualization software and techniques are advancing. As an academic, whose primary job is as a researcher and teacher, my relationship with technology is rooted at the crossroads of excitement and dread; of just catching up and being perpetually behind. I feel excitement that advancements in web functionality and design, visualization techniques, and other technology-enabled practices are finally happening and can benefit my work and the work of my students. Conversely I am filled with dread that I rarely feel fully in-the-know, much less at the bleeding edge of these developments because my job doesn't necessarily reward that kind of knowledge. As a graduate student in the fall of 2000 (Is that really 14 years ago?) I earned a webmaster certification and followed that by helping in the redesign of several websites at my university. A decade later, as an assistant professor on the tenure clock, I was composing an academic webtext and I found myself needing the help of an undergraduate student to teach me how to integrate something called jQuery into my HTML5. I was dismayed over how rusty my skills had become once my tenure responsibilities had taken over.

But practically speaking, it is not essential for me to know how to code at will in the latest programming languages or be an expert in the latest software releases Maintaining that kind of knowledge would take time away from my ability to develop other kinds of knowledge, through published research, that would be of potentially greater benefit to my students and the field as a whole. And I'm not suggesting that there isn't valuable research to be done with regard to the latest in programming and software. Because,

actually, I spend my research time analyzing and writing about the ways students are composing texts and interacting with software programs that help them complete communication tasks. This research tracks current practice in an effort to shape future practice, but it doesn't require that I need to be expert in the latest changes to the newest release of Adobe CC or how to code in Ruby or Python. For instance, in a manuscript I am currently finishing up, I propose a more complex consideration of the idea generation stage of the document design process. I draw upon two years of survey data from graphic design and technical communication classes to show that design software and other technologies can help students generate solutions to design problems by exposing them to options that they may not have previously known existed. I also illustrate how students adopt a bricoleur approach to design that facilitates the design process more fully. This research enables me to make several recommendations for how instructors can negotiate the sketching-software divide in their classrooms to ensure that the idea generation process is optimized for all students.

But designing the study and collecting the data did not happen overnight. It took two years to collect the data I needed and in that time no fewer than three versions of Adobe Creative Suite were released, with the fourth version, Adobe Creative Cloud being released while I was writing up the research. My heavy research agenda has not afforded me the chance to stay up-to-date with the most recent Adobe CS/CC developments. And yet maintaining a working knowledge of these programs is important, as a teacher of technologically-mediated communication and design, because if I fall too far behind in my knowledge of new developments, I run the risk of failing my students by not adequately preparing them for new ways of thinking about textual design and production.

But how much knowledge is enough? I like to think that it's really just the "basics" that are important – because those basics reflect the visual thinking habits I am trying to instill in students (using layers, manipulating type, color, line, etc.) and can be transferred from one software program or version to another seamlessly. But the basics sometimes shift as well. When Illustrator migrated to the use of artboards in CS4, it was a substantial enough change to affect how someone might interact with the program from the start. And

when HTML5 came on the scene in 2012 as a single markup language that, combined with CSS3 and Javascript, would change the way we think about the mechanics of web design and functionality, continuing to work in previous versions of HTML (or programs that outputted to previous versions) seemed outdated.

But just because you know something is more advanced technologically doesn't mean you always have the time or resources to learn it or implement it. Recently my co-authors Stuart Blythe and Mike McCloud and I published an article in *Written Communication* in which we argued that researchers were selling themselves short by relying on pre-packaged survey software rather than developing their own instruments (with the assistance of programmers and statisticians) that would enable more complex and inter-connected data collection. And yet, a month ago while deciding to add a survey as one segment of a larger data collection, I struggled with a dilemma. I knew that I would get better data and response rates if I developed the survey instrument from scratch (as I advocated doing in our article). But I also recognized that the survey was not the primary data-collection method for this particular project and thus wouldn't warrant the additional time and effort it would take to do so. And so continues the perpetual pull between my desire for technological proficiency and the research and teaching time that would have to be sacrificed to ensure it. Over the future installments of this column I'd like to explore this pull, and some of the other relationships and dichotomies that academics working in communication design fields are continually trying to negotiate.

Themes for future columns include:

- The relationship between "user experience design," and technical/professional communication, and the chasm that seems to exist between what we would like to think we are preparing our students to do and what the actual requirements that front-end designer jobs are looking for.
- The relationship between universities and the software companies that provide the software we would like to use in our classrooms. And relatedly, the choice between allowing students in our classes to use open source software vs. requiring

the use of more expensive industry-standard software (i.e. Illustrator vs. Inkscape and Photoshop vs. GIMP).

- The relationship between information design and document design, investigating why/how/in what context/for what purpose we use each.
- The gap between academic job ads and industry job ads. While virtually no academic jobs ask for knowledge of specific software or technologies, a majority of industry jobs do. This certainly makes sense considering the differences in job responsibilities and trajectories, but it also exposes some points of disconnect if academics are the ones educating students for industry work.
- The relationship between academics and industry professionals. While academics are being encouraged to do more workplace research to benefit Industry, what exactly is Industry willing to do for academics in return? What should academics ask for?

Negotiating these dichotomies is where the work of communication design is happening. Communication technologies are advancing at a rapid pace and choices must continuously be made about what content, practice, and software we should engage with, to what ends, and with what consequences. I hope future installments of this column will contribute to that conversation.

# Building Better Help: User Characteristics' Effect on Library Help Design


## Tao Zhang

**Purdue University**
**zhan1022@purdue.edu**

## Ilana R. Barnes

**Purdue University**
**barnes@purdue.edu**

## Marlen Promann

**Purdue University**
**mpromann@purdue.edu**



## Abstract

The goal of this study is to examine the effect of user help seeking characteristics on their perception of library help design principles, formats and tools. Structural equation modeling (SEM) of a questionnaire survey results showed a number of significant regression relationships. Analysis of open-ended survey questions revealed existing user behaviors such as preferred help formats and gave insights into the likelihood of using a help system.


## Introduction

Online user help has become an important part of a library's service for effective information access. There are help design principles and various help formats and tools available (Purchase & Worrill, 2002); however, they are not linked with user characteristics and help seeking preferences (Bartholomé, Stahl, Pieschl, & Bromme, 2006), especially in the library context. In this study, we have identified characteristics that influence users' help seeking and impact the effectiveness of library help design. Those characteristics

include: library familiarity, perceived competence, work avoidance, and task orientation (learning- vs. performance-oriented). There is a need to examine how these user characteristics affect the perception of library help design, in order to create library help that is tailored to the users' individual characteristics and needs.

## Method

Thirty-six student participants (15 females and 21 males, mean age = 21.5 years and SD = 3.5 years) were recruited for a 30-minutes questionnaire survey about user characteristics and library help. Participants provided five-point Likert scale ratings for questions regarding familiarity of libraries, perceived competence, work avoidance, and task orientations. They ranked help design principles, formats of help documentation (e.g., index, videos, and screenshots), and tools available in help systems (e.g., search, top questions, and expert chat). Participants also answered open-ended questions regarding their current experiences, preferences, and expectations of library help.

We used IBM SPSS Amos 21 to construct three structural equation models. The models included five exogenous variables: library familiarity, perceived competence, work avoidance, learning orientation, and performance orientation. The first model had ten endogenous variables (rankings of the ten help design principles); the second model had seven endogenous variables (rankings of the seven help formats); and the third model had ten endogenous variables (rankings of the ten help tools or features). The Cronbach's $\alpha$ values for variables ranged from 0.8 to 0.9, in support of good construct reliability (Nummally & Bernstein, 1994). We used maximum likelihood method to estimate the regression weights and we excluded any variables with non-significant regressions or with absolute regression weights less than 0.3. The final models achieved an acceptable fit ($\lambda^2/df < 5$; CFI, IFI, NFI, and NNFI > 0.9; GFI and AGFI > 0.8; PGFI > 0.5; RMSEA < 0.08) (Hooper, Coughlan, & Mullen, 2008).

# Results

## *Structural Equation Modeling*

The structural equation models between user characteristics and rankings of help design principles, help formats and tools showed a number of significant relationships between user characteristics and rankings. For example, the regression weight between perceived competence and Principle 3 (help should be conceptual) is 0.358, suggesting that users with more experience of libraries are willing to learn conceptual information. Similarly, the regression weight between library familiarity and screenshots is -0.377, indicating users familiar with libraries do not have a strong need for information represented by screenshots. The complete modeling results are presented in the poster. Note that the structural equation models were based on only 36 participants' responses, making the specific regression weights less reliable than what we would have if we had a larger sample of users. Therefore, the modeling results suggest possible significant relationships but additional data are needed for further validation of the models.

## *Open-Ended Questions*

Open-ended questions were coded into groups of responses and revealed aspects of user help seeking habits not fully explored in the SEM that are valuable for library help design. The open-ended questions covered help seeking process, accomplishment motivation, and the preferences in help features, information formats and tools.

When students were asked about the usual ways they seek help when using library resources, they majority accepted the premise that they would ask for help if in need. Primary sources participants listed include the library front desk, a professor, or another student. The responses, however, divided into two. One half of the students reported clear preference to experiment first on their own, and to only ask for help when it was an option of last resort. These respondents seem to prefer to figure things out by themselves, e.g. *"I like to teach myself"*, *"I tend to mess around on my own until I find what I need."* Also, search functionality is frequently mentioned as the primary tool they use to access the library

database, e.g. *"To browse for relevant information"* and *"Find articles and journals"*. The other half of respondents had a preference to ask for help immediately in order to save valuable time. Front desk is the primary help point for these students and is especially preferred, when the issue at hand is technical or systemic (e.g. downloading a PDF file and a misplaced book), or when reference-related advice is sought (e.g. what and how to search and what are reliable sources). Besides independent experimentation and front desk help, responders also consider professors and other students as helpful sources for help. Professors are generally consulted before or after coming to the library and, especially, when students need to verify the relevance of a particular source. If the help sought is procedural rather than conceptual, other students tend to be the primary source of help. This is due to the easy access of other students due to proximity (e.g. in the library sitting next to each other, in the halls of residence they are living together) as well as likely prior experience (other students are assumed to have faced this issue already and to have a quick solution as a result).

The majority of students felt favorably about an online help from the library website. Easy, effortless and time saving design features were stated as crucial for such interest, e.g. *"The more efficient/convenient the help is the more I'll use it"*. Approximately 15% of the students were negligent to use the library help, even if it would allow them to learn to use the library website efficiently. Most of these students prefer *"personal help by a real person"*. They perceive interactions with real people, e.g. librarians, as more speedy and thorough. A handful of respondents do not want to learn the library system at all. Most of them do not think they need to use it, e.g. *"I don't write many research papers"*, or they already use Google or the Internet for doing their resource searches.

Participants were asked to explain whether they like procedural (step-by-step) or conceptual (diagrams, concept maps) help materials. The respondents are dived relatively equally on this matter. One half of the respondents prefer step-by-step guide, while the other half find the visual conceptual material, such as diagrams and concept maps, easier to follow. Procedural help is usually preferred when issues are immediate and solutions are wanted quickly, such as with technical issues. Step-by-step

guidance is also more beneficial when respondents feel they are under time pressure but need to avoid further errors. The desire to "*know I'm doing it right*" is common among the insecure students. While respondents tend to prefer procedural help when they face a complex technical or rare issue, conceptual help is perceived as better when the issue is considered frequent and systematic. Overall, the students do not have a strong preference for one over the other. It tends to be a matter of personal preference based on perceived efficiency and the problem at hand. A quarter of respondents acknowledged how the two perspectives complement each other. In any case, visual material is strongly preferred over any textual format. It was commonly accepted across the respondents that visual material is easier to comprehend than textual, e.g. "*I look for videos, snaps*," "*I don't have time to read long paragraphs,"* and it was claimed to be more engaging compared to its textual counterpart.

To get an insight into the kind of format users would like to receive information in, students were asked about the ways they would prefer to get the help advice. More than half of the respondents indicated preference towards chat or some other talk function, whereas a third would prefer something static, such as a web page. Of those who preferred a chat function, a quarter would like to have it online. This was reasoned for its instantaneous and interactive qualities, e.g. *"keeps me less frustrated"* and *"can share screenshots."* A number of students emphasized the fact that it leaves a printable text copy of the discussion behind for a possible later need. Others had a preference towards person-to-person help. In-person help seeking is complimented for clearer problem solving advice (e.g. *"explain better"*) and faster response time. As a result it is perceived to offer speedy problem-resolution, e.g. "*faster than email*." About one third of the respondents prefer to use something static as a help source. This static guide is conditioned as a comprehensive and dynamic website that is fast and easy to use. Frequently, this static page is mentioned as the preferred option after help is sought from *'too busy'* library personnel or the problem is too complex to resolve with quick step-by-step guide or by other means. Some respondents are explicit about their primary preference "*to solve [his/her] problems without the involvement of people*," no matter the particular design or format of information

provision. One quarter of students acknowledge the pros and cons of both formats and offer a more nuanced preference that includes both, depending on their issue at hand. They acknowledge that different contexts could lead them to have different preferences, e.g. *"In order of increasing complication of the problem, I prefer web page, chat, and then email."* Furthermore, they admit that "*limiting to one resource is low quality help."*

## Discussion and Conclusion

We examined the relationship between user characteristics ratings and open-ended question responses. There is a strong correlation between perceived competence and type of help (procedural vs. conceptual). We found that participants with high perceived competence and library familiarity tend to experiment first and want procedural help, while participants with low perceived competence and library familiarity tend to seek help online and prefer conceptual information. Work avoidance, learning and performance orientation affect participants' help seeking preferences. Participants with high work avoidance prefer person-to-person help and ask whoever expert they can find at the moment they need help; and participants with low work avoidance prefer easy to follow procedural help online. If learning or performance orientation is high, participants tend to first experiment on their own and like online help to be able to think and digest the information at their pace. However, participants with low learning orientation would ask experts and seek online procedural help, and participants with low performance orientation still prefer to figure it out themselves and prefer help materials that are visual and conceptual.

The relationships above are similar to what the structural equation models suggest. Therefore, both the structural equation models and open-ended questions reveal some common themes and empirical guidance for prioritizing library help design principles, formats, and tools.

In addition, the user characteristics measured in this study could be useful for user segmentation and personas creation as part of a user-centered design process for library help systems. The SEM

methodology complemented by open-ended questions could be extended to similar efforts of linking user characteristics to help design. Future studies could first employ a large sample questionnaire survey to help construct reliable structural equation models, and then conduct one-to-one targeted user interviews based on the modeling results.

## References


Bartholomé, T., Stahl, E., Pieschl, S., & Bromme, R. (2006). What matters in help-seeking? A study of help effectiveness and learner-related factors. *Computers in Human Behavior*, *22*(1), 113–129.

Hooper, L., Coughlan, J., & Mullen, M. R. (2008). Structural equation modelling: Guidelines for determining model fit. *Electronic Journal of Business Research Methods*, *6*(1), 53–60.

Nummally, J. C., & Bernstein, I. H. (1994). *Psychometric Theory*. New York: McGraw-Hill.

Purchase, H. C., & Worrill, J. (2002). An empirical study of on-line help design: features and principles. *International Journal of Human-Computer Studies*, *56*(5), 539–566.

# Building Better Help: User Characteristics' Effect on Library Help Design

**Tao Zhang, Ilana R. Barnes**

Libraries, Purdue University, 504 W. State Street, West Lafayette, IN 47907

## Introduction

Online user help has become an important part of a library's service for effective information access. Currently, help information is being disseminated through a number of channels which often utilize various formats and features to present the help information. While effective for users familiar with libraries, library help design often lacks the consideration of specific user characteristics of help seeking. There is a need to examine how user characteristics affect the perception and use of library help systems. Such understanding can help design library help formats and features that are tailored better to the characteristics and needs of individual users.

## Related Work

- An array of research has explored user preferences of different help formats. Purchase and Worrill [1], for example, empirically tested and ranked a set of on-line help features and design principles from existing systems and user feedback. They suggested that help features and design principles are open to individual intrepretation.
- Pre-conceived beliefs affect task performance. Bartholomé et al. [2] showed that prior knowledge, self-estimated competence, and beliefs about the genesis of knowledge had impact on task performance in an interactive learning environment (ILE) for plant identification.
- Most notably, Aleven et al. [3] pointed out how help seekers can be classified as learners and learners with different profiles of help seeking activities can be described using a set of learner characteristics. They also pointed out that different types of help may cause different types of help seeking activities and result in different learning outcomes.
- User Characteristics and the specific help formats and features impact the outcome of help seeking. In order to offer effective and efficient help, library help should be designed to account for users' individual needs and characteristics.

## Model

- We developed a structural equation model (Figure 1) between user characteristics and rankings of help design principles, help formats and features.
- We identified characteristics influencing users' help seeking and thus effectiveness of library help design: *library familiarity* [4], *perceived competence* (of seeking help), *work avoidance* (i.e., tendency to avoid effort), and task orientations (*learning-* vs. *performance oriented;* i.e., gaining more knowledge versus finishing the task) [5].

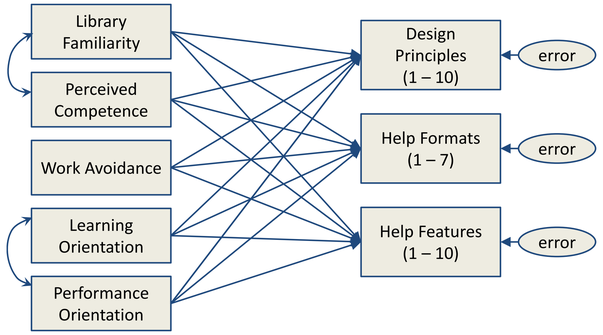



Figure 1. Research Model.

- The design principles [1] included:

Help should be/do:
1. Easy to understand.
2. Procedural.
3. Conceptual.
4. Unobtrusive.
5. Accurate.
6. Use non-technical instructions.
7. Easy to access.
8. Retain the user's current view and context.
9. Relevant to the user's immediate situation.
10. Offer multiple navigation methods.

- The help formats and features included:

Index, screenshots, table of contents, video tutorials, section headings, relevant information, images.

Search function, tooltip, ranking for helpful content, favorites, share on social network, expert contact information, chat with expert, glossary, top questions.

## Method

- Thirty-six student participants (15 females and 21 males, mean age = 21.5 years and SD = 3.5 years) were recruited for a 30-minutes questionnaire survey.
- Participants provided five-point Likert scale ratings for questions regarding user characteristics and they ranked help design principles (from 1 to 10), help formats (1 to 7) and features (1 to 10).
- Participants answered open-ended questions regarding their experience, preferences, and expectations of library help.

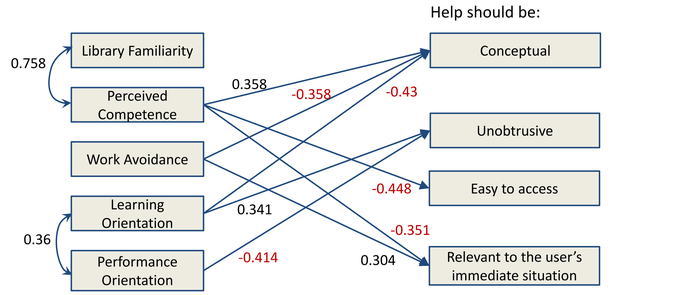
## Results

### Structural Equation Modeling (SEM)

The SEM modeling results showed significant relationships between user characteristics and rankings. The diagrams (see Figure 2) in this poster shows coefficient values higher than 0.3.

### Open-Ended Questions

- One half of respondents reported clear preference to experiment first and to only ask help when it was an option of last resort; the other half had a preference to ask for help immediately through the library front desk, a professor, and other students.
- Participants expressed an expectation of the library website to offer an intuitive, easily accessible, and predictive central search across all resources. Help from librarians, either in-person or through online chat, is highly regarded.
- Visual material is strongly preferred over textual format. The preference of procedural vs. conceptual help, and read vs. chat is dependant on specific situations.



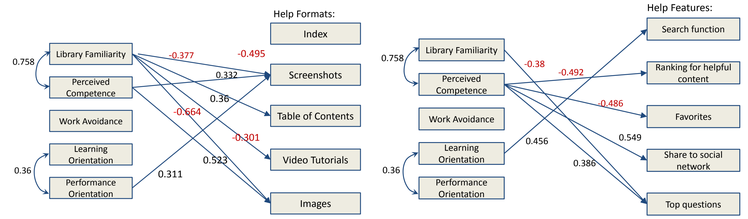




Figure 2. SEM Results.

## Conclusion

The modeling and qualitative results provide guidance for prioritizing design principles, formats, and features in library help implementation. It also helps user evaluation based on different help seeking characteristics and preferences. The user characteristics measured in this study could be useful for user segmentation. The SEM methodology complemented by open-ended questions could be extended to similar efforts of linking user characteristics to help design.

## References

[1] Purchase, H.C. and Worrill, J. 2002. An empirical study of on-line help design: features and principles. International Journal of Human-Computer Studies. 56, 5, 539–566.
[2] Bartholomé, T. et al. 2006. What matters in help-seeking? A study of help effectiveness and learner-related factors. Computers in Human Behavior. 22, 1, 113–129.
[3] Aleven, V. et al. 2003. Help Seeking and Help Design in Interactive Learning Environments. Review of Educational Research. 73, 3, 277–320.
[4] Landrum, R.E. and Muench, D.M. 1994. Assessing students' library skills and knowledge: The library research strategies questionnaire. Psychological Reports. 75, (1994), 1619–1628.
[5] Nicholls, J.G. 1989. The competitive ethos and democratic education. Harvard University Press.

**Contact: zhan1022@purdue.edu**

# Remediation in Data Visualization: Two Examples of Learning in Real-Time Data Processing Environments


## Justin Young

**Eastern Washington University**
**jayoung@ewu.edu**

## Charlie Potter

**Eastern Washington University**
**charlieraepotter@gmail.com**



## Abstract

Our poster is an exploration of the effects of quantifying physical experiences and refashioning them into new, interactive, live experiences through data visualization; the poster explores how data visualizations are designed to teach and effect change. Specifically, the authors explore two topics: athletic training and teacher training. Both of these fields have been inundated by data analysis tactics; sports data visualizations are highly developed and hypermediate while teacher training data are still largely immediate and static Through an analysis of these two topics in relation to theories of phenomenography and remediation, the poster discusses how the use of real-time data analysis and data visualization common in sports training might inform how that we effect change in other fields, such as teaching.


## Introduction

*"Let's say you've got 40 apples on your tree. I could eat about 30 of them, but I've begun limiting myself to 15 or 16. Let's take the wide-open three and the post-up at the nail. Those are good apples. Let's throw out the pull-up three in transition and the step-back fadeaway. Those are rotten*

*apples. The three at the top of the circle — that's an in-between apple. We only want the very best on the tree."—Kevin Durant*

In April 2013, NBA player Kevin Durant, of the Oklahoma City Thunder, admitted to hiring a data analyst. *Sports Illustrated* reports that Durant caters his training to "numerical imbalances," memorizes situational shooting statistics, and waxes metaphorical about basketball and apples in order to improve his game and best his rival, LeBron James. On both private interfaces, like those used within the NBA and likely by Durant's analyst, and public interfaces, like Tableau Public, these data are made visual and interactive, allowing players, coaches, and analysts to imagine alternate outcomes and speculate about statistical improvements to a player's or team's strategy. In a quote excerpted for the *SI* cover, Durant explains one motivation for hiring the analyst: "I'm tired of being second. I'm not going to settle for that. I'm done with it."

Meanwhile, in an online public school classroom, a high school student learns about molecular theory from a computer program called Connected Chemistry. Based on the choices the student makes and answers s/he provides, a teacher mines data in order to offer a plan for student improvement and learning. This kind of software provides real-time feedback to both the student and teacher on information from content-based mastery to high school drop out potential. These data are then compiled into "dashboards" that can be used by institutions and beyond; in fact, the United States Department of Education has a dashboard of data from across the country. Those dashboards make the data easy to interpret, interactive, and visually interesting.

Our poster is an exploration of the effects of quantifying physical experiences and refashioning them into new, interactive, live experiences through data visualization; in other words, we are exploring how data visualizations are designed to teach and effect change. Specifically, we explore two topics: athletic training and teacher training. Both of these fields have been inundated by data analysis tactics; sports data visualizations are highly developed and hypermediate while teacher training data are still largely immediate and static Through an analysis of these two topics in relation to theories of phenomenography and remediation, we discuss how the use of real-time data analysis and data

visualization common in sports training might inform how that we effect change in other fields, such as teaching.

## Literature Review

Several recent studies explore the relationship between learning and phenomenography, a qualitative research method that attempts to explore how people interpret various lived experiences. When used in relation to learning outcomes, phenomenography allows people "to compare their original (or old) experiences of [a] skill or concept to their new experience of the skill or concept" (Yates, Partridge, & Bruce, 2012). Teaching principles derived from phenomenographic methods seek to change and/or investigate the ways that students view an aspect of their world (Booth, 1997). When applied to teachers themselves, phenomenographic studies suggest that teachers have radically different understandings of student engagement and learning (Harris, 2008).

Each of the aforementioned studies uses a type of data visualization and real-time process to reach conclusions about human perception. The reverse is also true; phenomenography can help researchers understand the ways people interpret data visualizations (Isenberg et al, 2008). Specifically, phenomenography can help teachers understand the ways their data visualization tools are received by students (Levy, & Ben-Ari, 2007). Our research project imagines the opportunities offered by information visualization for changing practice in educational processes like teaching, coaching, and learning through a theoretical interpretation of the power of real-time data analysis and phenomenography.

## Theory and Methods

This poster specifically reports on a theoretical inquiry into current practices of data analysis and visualization in sports and education. The researchers use the theory of remediation, described by Jay David Bolter and David Grusin (2000), to conduct an analysis of current practices of data analysis and visualization in athletic training and teacher training. The authors hypothesize that the practice of real-time data collection and analysis in professional

sports training is largely hypermediate, while teacher education and assessment continues to rely on data that are immediate and static. These contrasting approaches will be evaluated in order to better understand how data can best be used to effect change. Theoretical implications for current data visualization theory, as well as current practices in phenomenography and teacher training will be discussed.

A clear connection exists between the prominence of data visualization today and the new media concepts of hypermediacy, immediacy, and remediation developed by Bolter and Grusin (2000). Interactive or artistic remediations of numeric symbols attempt to improve upon raw data while reminding users of the original, immediate symbols; in this way, visualizations of data are hypermediate, interactive, and immersive. Bolter and Grusin explore the influence of this interactivity on mediated human experiences, arguing that "If the logic of immediacy leads one either to erase or to render automatic the act of representation, the logic of hypermediacy acknowledges multiple acts of representation and makes them visible" (2000, p. 34). Data imagery is hypermediate, acknowledging and making visible acts of remediation. Conversely, raw data is much more immediate or transparent. The numeric symbol, however, is not a window to the real. Kenneth Burke argues that "naïve verbal realism" relies on the immediacy of language, and similarly a certain "naïve numeric realism" is present in our interactions with raw numeric data (Burke, 1966). If the concept of immediacy is the perfection of the gap between signifier and signified, it should not be surprising that quantitative data feel so "real" and "meaningful"; yet, they are still remediations.

Our project explores the idea that data-based efforts in the evaluation and education of personnel suffer in the presence of this naïve numeric realism; that the most effective efforts to promote improvement and change should be based on the analysis and visualization of real-time, hypermediated data, rather than static, immediate data. To be most effective, such efforts should be tied to phenomenography, enabling individuals to interpret past lived experience in light of hypermediated data in order to improve future practice and outcomes.

## Discussion

Sports data visualizations are highly developed and hypermediate, as in the case of SportVU, a service that provides 25-frames-per-second optical tracking data, quantifying video of player performance for visualization and analysis (Maymin, 2013). At least 15 NBA teams now employ this SportVU system for data capture, which includes cameras originally developed for tracking missiles (Goldsberry et al., 2013). SportVU provides the hardware system, tracks the movement of each player in every game played at the given arena, and then provides the derived raw data in the form of spreadsheets to each participating team. The teams themselves are responsible for analyzing and then visually presenting that data so that it can be applied to training as well as game time situations (Lowe, 2013). Data analysts and programmers are currently developing strategies and tools that enable interactive, rapid analysis of SportVU data so that it can be collected and applied in real-time (Maheswaran et al, 2012; Goldsberry, & Weiss, 2013; Maheswaran, 2013). The collection of data from the physical, lived experience of the players, and hypermediation of that data via visualizations that can be presented back to participants in real-time, have the potential to dramatically impact not only how players are coached, but how the game itself is played.

An example that illustrates the contrast between the usefulness of immediate raw data and hypermediated data is seen in the current sports analytics discussion of three point shooting (Lowe, 2013). Analysis of optical tracking data suggests that teams should shoot more three pointers, challenging the naïve numeric realism of coaches who rely on conventional statistical benchmarks to determine who should be taking three point shots, and when. For example, the first image in the Sports section of our poster is an example of a data visualization created by the Toronto Raptors, derived from data generated by SportVU cameras. It represents an actual play from a live game, captured by the cameras. As Zach Lowe writes, the Raptors' analytics team would have liked number 22 (Rudy Gay) to shoot a contested three pointer at that point in the play, although it was still early in the shoot clock. This would generally be seen as a bad decision and a wasted play, by most traditional coaches—Gay is not a good three point shooter, the shot

would have been well defended, and there was still time to find a better shot for another teammate. (Gay did not take the shot, and the play resulted in a turn over.) Those involved in basketball analytics however, suggest that taking a three pointer in just about any scenario is a good decision —because it is more efficient that a two point jump shot. Alex Rucker, the Raptor's Head of Analytics sums up the conflict between traditional coaches and analytics experts this way: "'When you ask coaches what's better between a 28 percent 3-point shot and a 42 percent midrange shot, they'll say the 42 percent shot," Rucker says. "And that's objectively false. It's wrong. If LeBron James just jacked a 3 on every single possession, that'd be an exceptionally good offense. That's a conversation we've had with our coaching staff, and let's just say they don't support that approach.'" (Lowe, 2013)

In contrast to the use, in professional sports training, of hypermediated data derived from lived experience, teacher training data are still largely immediate and static, as evidenced in the numerical evaluations of the edTPA test, created by Stanford University and administered by Pearson, and the Teacher/Principal Evaluation Project. For example, in the case of the edTPA test, which has been adopted by several states for use as a formative and/or summative assessment of K-12 teacher candidates, feedback on the test is *only* provided in the form of a set of autonomous scores. The test attempts a holistic approach to teaching performance of teacher candidates by addressing issues like differentiation, reflection, and assessment. Additionally, the test includes a video component, in which teacher candidates must submit a video of themselves teaching a lesson. Although different states have chosen to adopt different versions of the test, the core test contains fifteen rubrics. The submission of the test itself requires evidence in the form of lesson plans, student work, feedback to students, and reflection. Nevertheless, the resulting evaluation of the test produces only a static set of scores. At the time of this research, neither the test taker nor the institution that has administered the test is provided with any explanatory feedback tied to this raw data. In another example, under programs such as No Child Left Behind and The Race to the Top, teachers are fired, and schools are shut down on the basis of immediate, static test scores. Major decisions, in an effort to promote change, are

made on the basis of data that has not been derived from lived practice, nor has this data been collected and then hypermediated in an effort to inform and shift practice in real-time.

## Conclusions and Questions

Training teachers using the hypermedited, data visualization strategies deployed in sports could move the discussion of teacher accountability away from the analysis of (raw, autonomous) student test data and towards the real-time analysis and visualization of data derived from the "lived experience" of a teacher in the midst of training. Finally, we suggest that the use of data in this way may move us away from a naïve numerical realism— the trust that raw data will tell us the truth of a situation— towards a more insightful analysis and application of data, which are derived from lived experience, represented visually, analyzed in real-time, and used to alter behavior and decision-making.

Further studies should work to challenge naïve numeric realism through the use of phenomenography, which, as noted above, is a qualitative research method that attempts to explore how people interpret various lived experiences. Phenomenography enables the researcher to analyze the experiences of individuals within a group, in relation to the experiences of rest of that group—a method particularly useful in a classroom setting. A phenomenographic study of teacher candidates (and their students) as they apply new pedagogical approaches on the basis of feedback provided as raw data versus hypermediated data could yield information that could be applied to the training of personnel in many fields. In this example, researchers could study teacher candidates varying experiences with and interpretations of raw and hypermediated data, the experiences of teachers as they applied this data to classroom practice, and the experience of students in the classrooms led by these teachers.

Feedback from audience members at the 2013 SIGDOC raised important questions and suggested future directions for research. Building from the discussion of phenomenography, one audience member suggested that this kind of study could be expanded and enhanced by application of network analysis to the classroom

ecology. As he pointed out, information gained from examining the individual, lived experiences of classroom participants could be greatly enhanced by an analysis of the network of relations found in the classroom. Such analysis would be invaluable in creating robust visual representations of data derived from lived classroom experience.

Finally, Andrew Mara from North Dakota State sounded an important note of caution. He suggested that recent examples of hypermediated data visualizations (like the visualizations provided in our poster) might actually make the mediation of data *less* visible, thereby naturalizing it, and, perhaps, lending it unwarranted credibility. Is there a point at which hypermediated data visualizations become so life-like, so "real," that audiences will come to accept them naively, in a manner akin to the naïve verbal realism about which Burke cautioned us? Further work must be done to examine the benefits and drawbacks of hypermediated visualization; the potential offered by the hypermediated approach represents many possible benefits to those involved with results-oriented lived experiences, and one cannot be sure how long it might take to weigh those benefits against the possible costs of endorsing data visualizations as a credible strategy for teaching and learning.

## Acknowledgements

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## References

Yates, C., Partridge, H. & Bruce, C. (2012). Exploring information experiences through phenomenography. *Library and Information Research* 36, 112, 96–119.

Booth, S. (1997). On phenomenography, learning, and teaching. *Higher Education Research & Development* 16.2, 135–158.

Harris, L. R. (2008). A phenomenographic investigation of teacher conceptions of student engagement in learning. *The Australian Educational Researcher*, 35.1, 57–79

Isenberg, P., Zuk, T., Collins, C., & Carpendale, S. (2008). Grounded evaluation of information visualizations. In *Proceedings of the 2008 Workshop on Beyond Time and Errors: Novel Evaluation Methods for Information Visualization*. BELIV'08. ACM: Florence, Italy, 9.

Levy, R. B. B., & Ben-Ari, M. (2007). We work so hard and they don't use it: Acceptance of software tools by teachers. *ACM SIGCSE Bulletin*, 39.3, 246–250.

Grusin, R., & Bolter, J. D. (2000). *Remediation: Understanding New Media*. MIT Press, Cambridge, MA.

Burke, K. (1966). *Language as Symbolic Action: Essays on Life, Literature and Method*. University of California Press, Berkeley, CA.

Maymin, P. (2013, March). Acceleration in the NBA: Towards an algorithmic taxonomy of basketball plays.[illegible] *MIT Sloan Sports Analytics Conference.*

Goldsberry, K., Kopp, B., Pavildis, H., & Zander, R. (2013). XY panel: The revolution in visual tracking. *MIT Sloan Sports Analytics Conference.*

Lowe, Z. (2013, March). Lights, camera, revolution. *Grantland.* Retrieved from http://www.grantland.com/story/_/id/9068903/the-toronto-raptors-sportvu-cameras-nba-analytical-revolution

Maheswaran, R., Chang, Y. H., Henehan, A., & Danesis, S. (2012, February). Deconstructing the rebound with optical tracking data. [illegible] *MIT Sloan Sports Analytics Conference.*

Goldsberry, K. & Weiss, E. (2013, March). The Dwight effect: A new ensemble of interior defense analytics for the NBA. [illegible] *MIT Sloan Sports Analytics Conference.*

Maheswaran, R. (2013, March). DataMorphing: Dynamic interaction with basketball big data. [illegible] *MIT Sloan Sports Analytics Conference.*

# Remediation in Data Visualization:

# Two Examples of Learning in Real-Time Data Processing Environments

Justin Young and Charlie Potter

Eastern Washington University

## INTRODUCTION

Our poster is an investigation of the effect of quantifying physical experiences and refashioning them into new, interactive, live experiences through data visualization; in other words, we are exploring how data visualizations are designed to teach and effect change. Specifically, we explore two topics: athletic training and teacher training. Both of these fields have been inundated by data analysis tactics; sports data visualizations are highly developed and hypermediate while teacher training data are still largely immediate and static. Through an analysis of these two topics in relation to theories of remediation, we discuss how the use of real-time data analysis and data visualization common in sports training might inform how that we effect change in other fields, such as teaching.

## THEORY AND METHODS

This poster specifically reports on a theoretical inquiry into current practices of data analysis and visualization in sports and education. The researchers use the theory of remediation, described by Jay David Bolter and David Grusin, to conduct an analysis of current practices of data analysis and visualization in athletic training and teacher training [6]. We hypothesize that the practice of real-time data collection and analysis in professional sports training is largely hypermediate, while teacher education and assessment continues to rely on data that are immediate and static. These contrasting approaches will be evaluated in order to better understand how data can best be used to affect change. Theoretical implications for current data visualization theory, as well as current practices teacher training will be discussed.

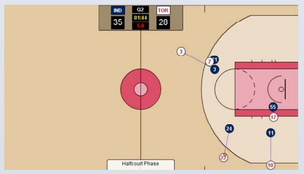
A clear connection exists between the prominence of data visualization today and the new media concepts of hypermediacy, immediacy, and remediation developed by Bolter and Grusin [1]. Interactive or artistic remediations of numeric symbols attempt to improve upon raw data while reminding users of the original, immediate symbols; in this way, visualizations of data are hypermediate, interactive, and immersive. Bolter and Grusin explore the influence of this interactivity on mediated human experiences, arguing that “If the logic of immediacy leads one either to erase or to render automatic the act of representation, the logic of hypermediacy acknowledges multiple acts of representation and makes them visible” [1]. Data imagery is hypermediate, acknowledging and making visible acts of remediation. Conversely, raw data is much more immediate or transparent. The numeric symbol, however, is not a window to the real. Kenneth Burke argues that “naïve verbal realism” relies on the immediacy of language, and similarly a certain “naïve numeric realism” is present in our interactions with raw numeric data [2]. If the concept of immediacy is the perfection of the gap between signifier and signified, it should not be surprising that quantitative data feel so “real” and “meaningful”; yet, they are still remediations.

Our project explores the idea that data-based efforts in the evaluation and education of personnel suffer in the presence of this naïve numeric realism; that the most effective efforts to promote improvement and change should be based on the analysis and visualization of real-time, hypermediated data, rather than static, immediate data.

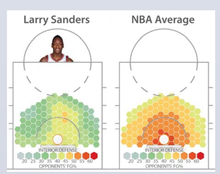
## SPORTS

Sports data visualizations are highly developed and hypermediate, as in the case of SportVU, a service that provides 25-frames-per-second optical tracking data, quantifying video of player performance for visualization and analysis [3]. At least 15 NBA teams now employ this SportVU system for data capture, which includes cameras originally developed for tracking missiles [4]. SportVU provides the hardware system, tracks the movement of each player in every game played at the given arena, and then provides the derived raw data in the form of spreadsheets to each participating team [5]. The teams themselves are responsible for analyzing and then visually presenting that data so that it can be applied to training as well as game time situations [5]. Data analysts and programmers are currently developing strategies and tools that enable interactive, rapid analysis of SportVU data so that it can be collected and applied in real-time [6, 7, 8].

The collection of data from the physical, lived experience of the players, and hypermediation of that data via visualizations that can be presented back to participants in real-time, have the potential to dramatically impact not only how players are coached, but how the game itself is played. An example that illustrates the contrast between the usefulness of immediate raw data and hypermediated data is seen in the current sports analytics discussion of three point shooting [5]. Analysis of optical tracking data suggests that teams should shoot more three pointers, challenging the naïve numeric realism of coaches who rely on conventional statistical benchmarks to determine who should be taking three point shots.




Data visualization that illustrates when a player *should* have taken a 3-point shot in a game [5].




Representation of the effectiveness of a specific defensive center in the NBA versus the average NBA defense [7].

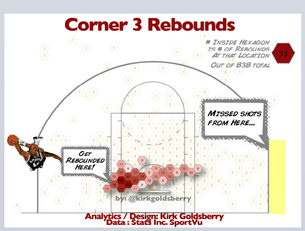


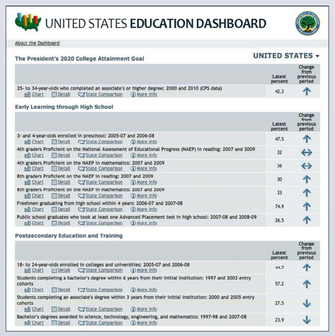

Illustration of where a ball is likely to be rebounded in relation to the position of the shooter on the court[Courtvisionanalytics.com].

## TEACHER EDUCATION

Training teachers using the hypermediated, data visualization strategies deployed in sports could move the discussion of teacher accountability away from the analysis of (raw, autonomous) student test data and towards the real-time analysis and visualization of data derived from the “lived experience” of a teacher in the midst of training.

Standardized exams like the edTPA move toward a performance based assessment of students. This exam asks students to record video of themselves teaching a lesson during their primary clinical experience. The students include lesson plans and reflection alongside the video, which is evaluated against several rubrics. However, these tests capture only one moment from student teaching. Moreover, they do not allow for any real intervention but depend upon the isolated example to determine preparation for teaching and potential for teaching success. Evaluations of employed teachers work in a similar fashion.

Although data is becoming a larger part of teacher education, little has been done with data visualization or real-time data analysis. “Dashboards” are the most common type of visualization software. They aggregate data on students and districts for administrators and teachers to view. However, they are largely static, often resembling spreadsheets with little functionality or ability to query the results. Comparing these “dashboards” with examples of data visualization in sports, we see a contrast between the representations themselves *and* the nature of the data represented. Data usage in sports training is focused on the *actions* of individuals in a lived situation, and the remediation of data derived from those actions so that the resulting data can be understood and applied by those in training. Conversely, data usage in teacher training and evaluation is often less focused on the lived practices of developing teachers and the data collected is rarely remediated in a way that enables trainees to apply this data directly to improving those practices.




A snapshot of the dashboard used by the Department of Education

**Secondary-Level English Language Arts (ELA) Participation Results**

| Student Group | Tested 95% | 12th Graders | 12th Graders with Valid Test Scores | Percent of 12th Graders with Valid Test Scores |
|---|---|---|---|---|
| All Students | ✓ | 525 | 517 | 98% |
| American Indian or Alaska Native | — | 4 | — | — |
| Black or African American | ✓ | 323 | 320 | 99% |
| Hispanic or Latino | ✓ | 66 | 64 | 97% |
| Asian or Native Hawaiian/Other Pacific Islander | — | 30 | — | — |
| White | ✓ | 99 | 99 | 100% |
| Multiracial | — | 3 | — | — |
| Students With Disabilities | ✓ | 41 | 40 | 98% |
| Limited English Proficient | — | 30 | — | — |
| Economically Disadvantaged | ✓ | 269 | 263 | 98% |

✓ At least 95% of 12th graders were tested.
✗ Less than 95% of 12th graders were tested.
— There were fewer than 40 12th graders in the group.

Typical presentation of aggregated education data by school

## CONCLUSIONS

Teacher training data are still largely immediate and static, as evidenced in the numerical evaluations of the edTPA test, created by Stanford University and administered by Pearson, and the Teacher/Principal Evaluation Project. For example, in the case of the edTPA test, which has been adopted by several states for use as a formative and/or summative assessment of K-12 teacher candidates, feedback on the test is *only* provided in the form of a set of autonomous scores. Neither the test taker nor the institution that has administered the test is provided with any explanatory feedback tied to this raw data. In another example, under programs such as No Child Left Behind and The Race to the Top, teachers are fired, and schools are shut down on the basis of immediate, static test scores. Major decisions, in an effort to promote change, are made on the basis of data that has not been derived from lived practice, nor has this data been collected and then hypermediated in an effort to inform and shift practice in real-time.

We suggest that the use of data derived from lived experience, represented visually, and analyzed in real-time, may move us away from a naïve numeric realism— the trust that raw data will tell us the truth of a situation— towards a more insightful analysis and application of data to promote change as well as alter behavior and decision-making. Further studies should work to challenge naïve numeric realism through the use of phenomenography, a qualitative research method that attempts to explore how people interpret various lived experiences. When used in relation to learning outcomes, phenomenography allows people “to compare their original (or old) experiences of [a] skill or concept to their new experience of the skill or concept” [9]. When applied to teachers themselves, phenomenographic studies suggest that teachers have radically different understandings of student engagement and learning [10]. A phenomenographic study of teacher candidates as they apply new pedagogical approaches on the basis of feedback provided as raw data versus hypermediated data could yield information that could be applied to the training of personnel in many fields.

## REFERENCES

[1] Grusin, R., & Bolter, J. D. 2000. Remediation: Understanding New Media. MIT Press, Cambridge, MA.

[2] Burke, K. 1966. Language as Symbolic Action: Essays on Life, Literature and Method. University of California Press, Berkeley, CA.

[3] Maymin, P. 2013, March. Acceleration in the NBA: Towards an Algorithmic Taxonomy of Basketball Plays. MIT Sloan Sports Analytics Conference.

[4] Goldsberry, K., Kopp, B., Pavildis, H., & Zander, R. XY Panel: The Revolution in Visual Tracking. MIT Sloan Sports Analytics Conference.

[5] Lowe, Z. Lights, camera, revolution. 2013, March. Grantland.

[6] Maheswaran, R., Chang, Y. H., Henehan, A., & Danesis, S. 2012, February. Deconstructing the rebound with optical tracking data. MIT Sloan Sports Analytics Conference.

[7] Goldsberry, K. & Weiss, E. 2013, March. The Dwight effect: A new ensemble of interior defense analytics for the NBA. MIT Sloan Sports Analytics Conference.

[8] Maheswaran, R. 2013, March. DataMorphing: Dynamic interaction with basketball big data. MIT Sloan Sports Analytics Conference.

[9] Yates, C., Partridge, H. and Bruce, C. 2012. Exploring information experiences through phenomenography. Library and Information Research 36, 112, 96-119.

[10] Harris, L. R. (2008). A phenomenographic investigation of teacher conceptions of student engagement in learning. The Australian Educational Researcher, 35, 1, 57-79

# Book reviews


## Beth Keller

**Michigan State University**
**keller6@msu.edu**


**Potts, L. (2013).** ***Social media in disaster response: How experience architects can build for participation.*** **New York, NY: Routledge.**

Liza Potts' recent book, *Social media in disaster response: How experience architects can build for participation*, explores the ways in which social web tools provide researchers and practitioners with opportunities to address disaster communication and information design for building participatory cultures. All too often, researchers and design practitioners in both the academy and industry think of social web tools as static, as "single-serving interfaces, systems, documents and silos" (1). In order to meet the progressive needs of contemporary knowledge workers, interdisciplinary teams that include humanists, social scientists, and technologists must build better architectures for everyday experiences users encounter in social media. Although issues of social media experience and participation may seem of concern to only a small group of information and experience designers—or, "experience architects," as Potts terms them—Potts argues that anyone who cares about writing, communication, social web design, and development should be deeply concerned with these issues, especially as they relate to how information is located and distributed as knowledge across the social web during times of disaster.

In six chapters, Potts details experience and the social web, methods for researching and building the social web, how to locate data and validate information, and how knowledge transfers during times of disaster. Her final chapter focuses on architecting systems for optimal participation; flexible frameworks, she notes, allow for useful and responsive communication, especially during a disaster.

The introductory chapter, "Experience, Disaster, and the Social Web" discusses how researchers and practitioners can build

mediated, social web systems that actually interact with, respond to, and facilitate what individuals do and need in social web spaces. For example, people use social web tools like Twitter and Facebook to share and link information and knowledge in order to communicate. Thus, the boundaries of (some) social web tools are porous and flexible, so that participants can build supportive online and offline groups can.

Chapter 2, "Methods for Researching and Architecting the Social Web" reviews how to trace and map digital culture. Potts builds her framework for understanding online and offline participatory culture(s) by situating her framework in sociotechnical-systems theory, user-centered design, and technical communication. One method, she writes, for tracing digital culture is to examine how participants share and alter content. Put another way, Potts urges us to explore how data is transformed into information, and how information is transformed into knowledge. What's more, Potts draws from Bruno Latour's Actor-Network Theory (ANT) ([1987] 2003), and explains how ANT can be used as a method for mapping social networking systems, and how participants use these systems to share knowledge with one another. Researchers, teachers, and practitioners must not only pay attention to participants, but must also interact with them to more fully understand the social, human-driven communication practices of contemporary knowledge workers.

Chapter 3, "Locating Data in the Aftermath of Hurricane Katrina" includes a disaster-specific case study examined via Potts' methods. Here Potts explores how individuals impacted by the aftereffects of Hurricane Katrina came together "to locate relevant content in their attempts to locate missing persons and share in data gathering efforts" (41). Building on her framework established in chapter 2, Potts further discusses ANT as a method for mapping disaster communication. She shows readers how to construct actor-network diagrams, and presents an easily understandable discussion of immutable mobiles (made objects that can be moved around and stay the same) and fire spaces (spaces where movement is unpredictable). Actors (both human and nonhuman), writes Potts, mobilize data and information so that other actors can find and validate data. Finding and using data, in this case, was essential in

locating displaced and hurt loved ones who were affected by the hurricane.

Chapters 4 and 5, "Validating Information During the London Bombings" and "Transferring Knowledge during the Mumbai Attacks" further examines how ANT can be used as a method for validating data and information during times of disaster. Potts begins Chapter 4 by showing how the movement of content is traced or translated during a given activity. Citing Callon (1986), Potts outlines the four phases of translation, which are problematization, interessement, enrollment, and mobilization (62). With the four phases in mind, she focuses the remainder of Chapter 4 on how the first two phases (problematization and interessement) of translation are visible during the London bombings. To illustrate the first two phases of translation, Potts focuses on the image of Adam Stacey as he escaped the London Underground. This image of Stacey was shared across multiple social web tools, thus indicating that a terrorist attack had occurred. Put another way, as actors and anchors emerge in a given activity, actor identity stabilizes and data is transformed into information.

In Chapter 5, Potts continues her discussion of translation by focusing on how information becomes knowledge, and how knowledge is pushed through a given network. Her case study for this chapter examines the series of terrorist attacks across Mumbai. The last two phases of translation, enrollment and mobilization, occur when "anchors track down [or validate] details regarding information" and then support the collective response of other participants, recognizing the "instances of composition, collaboration, and coordination as actors work to respond to their own needs or the needs of others" (87).

Chapter 6, "Architecting Systems for Participation" discusses possible trajectories for supporting participatory culture, and suggests key social software that could improve participants' communication practices across these social spaces. Additionally, chapter 6 considers how user experience designers and experience architects can work with participants in creating new technologies that promote social cohesion across multiple platforms (98). Of most interest to readers is the call to action Potts makes when she writes, "we must examine how everyday people extend the

information systems" that designers and developers create (100). Moreover, Potts advocates for participant-centered experiences, experiences that focus on the coordination of people, technologies, and the participation of the individuals and teams who make these social networking systems possible.

*Social Media in Disaster Response* succeeds in extending the conversations surrounding social media, collective action, and online and offline participatory cultures. As Potts so aptly writes at the close of her book, "Researchers and practitioners must see these systems as dynamic, fluid spaces in which the flow of information is a key goal […] Social systems—both online and offline—continue to evolve. We have a huge opportunity, as well as an enormous responsibility, to be part of that evolution in ways that can lead to more contextually aware experiences for our participants" (119).

# Book reviews


## Sheryl Ruszkiewicz

**Oakland University**
**ruszkiew@oakland.edu**


**Quesenbery, W. & Szuc, D. (2011). *Global UX: Design and research in a connected world*. Waltham, MA: Morgan Kaufmann.**

**Horton, S. & Quesenbery, W. (2014). *A web for everyone: Designing accessible user experiences*. Brooklyn, NY: Rosenfeld Media.**

In *Global UX: Design and research in a connected world*, Quesenbery and Szuc present a thoughtful and adaptable guide for the reader's individual needs or projects in relation to UX (user experience), regardless of the reader's experience level. Quesenbery and Szuc gathered material from 65 interviews of UX practitioners across the globe, and analyzed over 70 hours of interviews to represent current trends and personal experiences with UX. To highlight different voices and perspectives gathered from the interviews, the authors chose to provide multiple quotations and anecdotal, yet practical, stories to define UX terminology and concepts. Quesenbery and Szuc share many effective strategies for this process, while highlighting, through vignettes from their interviews, some of the difficulties and problem-solving strategies useful when working in UX on a global (or even local) scale. The book is divided into short, easily digestible chapters with infographics that summarize each chapter succinctly. This book provides enough structure to guide novice UX practitioners, while providing innovative anecdotes, tips, and strategies for more seasoned practitioners, as well. In addition, the information gathered from the interviews highlights the passion of those in UX, helping the reader to feel passionate about UX as well.

Purposefully and to its strength, this book is not a textbook or checklist. Quesenbery and Szuc both understand how the factors of humanity in UX make each project rhetorically (audience, author, message, and context) unique due to the fluidity of different products and cultures. Instead, the authors provide a frame for UX, which can be adapted to a unique situation, while still leaving room

for multiple perspectives from individuals, research curiosity, and unexpected surprises in fieldwork throughout the UX process. As exemplified by the process they used to gather information for the book, as well as their rhetorical strategies in the finished product, *Global UX* is a shining example of human-centered UX.

The connected world which Quesenbery and Szuc speak of is one created by the Internet, where once isolated, localized work is now global work, with people using and creating cross-country collaborations and products. This allows for a range of centralized (HQ) to decentralized (local) decisions based upon the given project or organization, allowing companies to think internationally and to create digital products that speak to a diverse, global audience. However, the authors note that not all digital products are inherently international. Global work, according to Quesenbery and Szuc, has the benefits of evening the playing field, and allowing contribution and competition from anywhere. Though true when everyone has equal access to the Internet, which allows anyone from anywhere to participate in global work, Quesenbery and Szuc fail to address issues of differential access.

Along with the benefits, Quesenbery and Szuc are careful to point out that global work also inherently contains added struggles such as language/cultural barriers and flexible schedules to accommodate time zones. Perhaps somewhat controversial to a US audience who has witnessed firsthand the loss of employment and the shift of local economies due to the outsourcing of manufacturing, Quesenbery and Szuc state that outsourcing is a positive change in an increasingly global society. Even though the increase of outsourcing does arguably have some local positive effects, the authors also fail to address the negative effects felt by countries who are seeing their jobs outsourced.

Perhaps the most valuable contribution to UX design, however, are the meditations of Quesenbery and Szuc on culture. The authors note the difference between company culture (symbols, heroes, rituals, and values) and culture in general (knowledge, language, beliefs, attitudes, practices, customs, and learned patterns). In either case, it is vital for those in UX to be aware of their own culture and how it may distort perceptions about other cultures. To be global, Quesenbery and Szuc stress the need to learn about local culture and

markets, gathering as much information as possible. Although, in this connected world, culture may be a difficult concept to pin down due to its fluidity through increasingly mobile and multicultural environments. Because of this, it is important for individuals conducting fieldwork in UX to be good listeners and to be committed to learning as much as possible while in the field. Information gleaned from fieldwork, including stories and pictures, will provide the largest resource to a given design team and the best chance to connect the information gathered in the field to the project at hand.

*Global UX* acknowledges that global work has changed and will continue to change companies, individuals, cultures and societies. As global work becomes increasingly commonplace, UX will continue to develop as a field in response to this shift. Global user experience identifies a need to approach technical communication and communication design from the humanity of users, highlighting and deeply valuing the perspectives and insights of users from all walks of life within the UX research and development process.

In light of this belief, in *A web for everyone: Designing accessible user experiences*, Horton and Quesenbery explore the positive implications of incorporating accessibility into the early stages of the design process. Although the title may indicate the audience of this book is primarily individuals who work with user experience and/or web design, the authors ask all designers, regardless of medium, to slow down and be thoughtful about their design processes from the early stages. When creating products in a world of almost instantaneous connectivity and interactivity, the authors' call to pause and be mindful seems counterproductive at first, but offers the opportunity to save overall time and resources, and to create a stronger product.

In the same way, Quesenbery acknowledges this newer book as a reflective response to her own previous work. In *Global UX* she and Szuc laud the evening power of global work, but fail to address the disparity of differential access. In *A web for everyone,* Horton and Quesenbery state, "the web is making the world a smaller and more connected place, but there is still much work to be done to make the web an inclusive place that everyone can use" (p.2). *A web for everyone* addresses how designers can create a product that is equally accessible for everyone, regardless of ability, culture, or

environmental barriers. To incorporate accessibility into the early stages of the design process, Horton and Quesenbery remind readers of the basic elements of any design: purpose and audience(s).

For any design or product, regardless of the medium, the authors suggest that designers take time to develop a clear and focused purpose to act as the anchor for the project. Many successful products are very effective at a single purpose. With technological advances, there are a plethora of elements that can be added to a product or service to make it "pop for a client" or draw the attention of a user. Instead of listing the multitude of elements that can be included in a design project, Horton and Quesenbery want designers to ask what *should* be added to enhance and support a project's purpose. Sometimes simplicity is the best design strategy, they remind us.

After creating a clear purpose, Horton and Quesenbery challenge the reader to be aware of and analyze the audience, without making assumptions and generalizations. The authors explain, "The Principles of Universal Design start from the premise that there is no typical, average, or normal user" (p.7). In Chapter 2, the authors use pathos (via vignettes elicited from users they have worked with) to explain the need for accessibility. Even though these stories help humanize statistics and data, Horton and Quesenbery warn that they are used as examples of individuals, not as representations for groups of people.

Chapter 4 explains that there are standards for web design (e.g. WAI and Wasp), just as there are architectural standards for buildings. These standards should be followed to create a quality product and a safe experience for everyone. Similarly, it is important to use to the right tool for the job, such as proper code executed in a standards-compliant fashion, so users from all walks of life can access a product, regardless of browser, platform, or ability level.

Horton and Quesenbery also discuss essential elements of web content such as text placement, size, color, and alignment. These elements are very similar to Robin Williams' "memorable—but rather inappropriate—acronym" of contrast, repetition, alignment, and proximity or CRAP (2008, p.13). Unlike Williams, Horton and

Quesenbery give design guidelines, but also encourage innovation and boundary pushing.

The authors suggest that by identifying patterns of interaction, information design, and genre expectation from the audience's prior knowledge, designers can create a product that is more intuitive and easier to navigate. This seems a clear connection to theories of gamification, which begin with the acknowledgement that users begin an experience "by tackling the obstacle of not knowing what to do and not knowing how to play" (McGonigal, p.26). By offering robust feedback systems that foster communication with a user, he or she is free to explore the product, learning the dimensions of online space, boundaries, and constraints. All users should feel in control of their experience with a product.

Horton and Quesenbery share simple and effective ways to incorporate accessibility into the design process, which creates stronger project workflows and results in products that are more accessible for everyone. In light of recent changes to "Net Neutrality," discussions of how people from all walks of life can gain access to the Web are more important than ever. Such discussions raise further questions, however, such as how will weakened Net Neutrality guidelines affect web accessibility in the future? Will global work become a more level field for all users, or will access disparity increase between users, websites, and Internet Service Providers? Perhaps Quesenbery and one or more of her past collaborators will choose to address these and other important questions in a forthcoming book.

## References

McGonigal, J. (2011). *Reality is Broken: Why Games Make Us Better and How They Can Change The World*. New York, NY: The Penguin Group

Williams, R. (2008). *The Non-Designer's Design Book*. 3rd ed. San Francisco, CA: Peachpit Press.