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Mapping Use, Storytelling, and Experience Design: User-Network Tracking as a Component of Usability and Sustainability

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Abstract

Framed around three different antenarratives about system development, this article builds on established user-centered theories to present a mixed-method approach to user experience (UX) design. By combining network theory, storytelling, and process mapping, this article provides a practical method of including users' experiences during the predevelopment stages of building workplace-specific digital technologies. Specifically, this article argues for the collection of user-generated antenarratives as the first step in UX product development and demonstrates how to use those experience-based stories.

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Philosophies associated with user-centered design, experience architecture, and the more modernly termed user experience (UX) design all have one factor in common: Human needs and their experiences should dictate product development practices. Each term is also attached to a shared ideological assumption that people who use a product will find it more usable if it matches their own needs and desires. Further, like other humanistic design developers, UX developers attempt to channel users' experiences in product development processes. As Getto, Potts, Salvo, and Gossett (2013) have explained, an important goal for most UX developers is "to design products that are not only usable, but will be used once they are launched" (p. 65). Usability is still an important concern, then, to researchers who adhere to UX development practices.

In this article, I build on already well-established humanistic design, usability, and UX practices. I argue, as Andrews et al. (2012) have, that one shortcoming sometimes associated with participatory design approaches is that "users are [often] involved in the design process too late to influence the final product" (p. 124). In response, Andrews et al. argued for a "collaborative prototype design process." In sharing three product development stories, I take their argument one step further. I offer a mixed-method approach that researchers can use to generate a user-centered interface design concept before they even consider developing a prototype. Specifically, I provide a way to first visualize, or map out, who will use a product and the processes those stakeholders will use to complete their work. I then present a way to gather information from those individuals, so that the eventual interface better matches what they already consider a well-designed, easy-to-use product. At its core, the methodology I offer is intended to help others create contextualized, sustainable application designs that meet the specific needs of an organization's employees.

Studying how people interact with workplace-specific digital technologies is an essential part of this methodology. But unlike more traditional usability-based studies, this study does not provide empirical data gathered in a usability lab. This is an intentional omission. Instead, as I explain in the next section, I argue for a research approach based on a branch of reflective storytelling called "antenarrative" (Boje, 2001). This approach focuses on collecting lots of stories gathered during casual conversations—conducted

outside the usability lab—regarding the technologies that stakeholders typically use outside their workplace. Collecting those stories highlights how important people's opinions about the digital technologies they have used are to usability concerns. I also demonstrate how those opinions are just as important as more formally collected sets of usability data. What I offer hinges on making eventual users design consultants and includes a practical method of gathering the descriptions necessary to develop an experience-based interface design that anticipates actual user experiences.

In this article, I use reflective storytelling, or antenarratives, in two ways. First, I use my own system development experiences to demonstrate the validity of collecting stories as a component of UX product development and sustainability.[1] Each of these experiences is included to illustrate the benefits of the mixed-method research model I present and the problems I encountered when I strayed from the offered approach. Second, I use reflective stories from stakeholders to demonstrate how collecting such stories is a useful research methodology that other UX developers can use to increase the sustainability of the workplace products they develop. The stories I share also help reaffirm a long-standing belief among many rhetorically aware usability researchers and scholars regarding how important human concerns are to usability (Brady, 2004; Johnson, 1998; Schneider, 2005). Just because a technology functions does not mean that the people who use it will find it valuable, need it, learn how to use its interface, or enjoy using it (see Latour, 2002).

Further, the mixed-method research model I offer is informed by narrative-based research practices and storytelling methodologies that are deeply rooted in technical communication theory (Faber, 2002; Moore, 2013; Moore & Elliott, 2016; Simmons, 2007; Spinuzzi, 2003). More specific to this article, Quesenbery and Brooks (2010) have previously connected storytelling as a methodology for usability researchers. As they have suggested, "Stories are a powerful tool in user experience design. They can help you understand users and their experiences better, communicate what you've learned, and use that understanding to create better products" (Loc. 370). Telling our stories, then, connects technorhetoricians who focus on usability issues and is one way to continue generating new narratives and to tie our work to the larger field of professional and technical communication. Without these stories, there would be no record of the work we accomplish.

To clarify, what follows is one way to complement what we already know about the humanistic-focused work that digital product developers often use. The mixed-method approach I propose—and illustrate through my three system-development experiences—offers a new starting point. I

argue that end users should be included in a participatory design study well before a prototype is developed or a typical needs assessment is conducted (see Courage & Baxter, 2005). Toward the end of the article, I also demonstrate why it is beneficial to talk to end users before determining whether to start developing a product. As I explain, although costs are of course involved in this research model, these costs are worth it if they can help prevent organizations from the far greater costs of developing products that are never used. Smaller, grassroots organizations, like the ones I discuss, often have a limited budget when it comes to information technology concerns. Wasting what resources they do have on developing a system that will never be released, or that does not make their organizational operations easier, seems unethical and problematic.

Adapted Methodologies From the Literature

A study of how people interact with digital technologies is an essential part of what I offer in this article. But I did not intend to study technology as a stand-alone object. Although having something to test is pivotal to most usability testing practices, the mixed-method research approach I offer here provides opportunities to include users before a prototype or even a wireframe for a digital product is developed. I argue that users should be included at such an early stage of product development because—as Andrews et al. (2012) have also argued—to create truly participatory designs, users should be part of the process from the beginning. Also, iterative testing and prototyping do not inspire initial interface design, and no current articulation of usability—in theory or practice—addresses this gap beyond suggesting including focus groups to create a needs assessment. Those limitations and gaps have led me to adopt a number of research methodologies for my own digital design and usability studies.

The first methodology I draw on is network analysis. As Latour (1999) has explained, networks can be viewed as a gathering of individuals, technologies, and information clouds that revolve around one common point, interest, or purpose. Castells (2000) has also pointed out that networks are a way to look at how people communicate or interact with each other. More specifically, networks are a way to look at how "human societies are made from the conflicting interaction between humans organized in and around a given social structure . . . formed by the interplay between relationships of production/consumption; relationships of experience; and relationships of power" (p. 7). Plus, as Zwijze-Koning and De Jong (2015) have claimed,

many interdisciplinary researchers use network analysis "to map the relationships between people in societies, organizations, and other groups" (p. 37). Including a network analysis as part of a usability project can help uncover and map the social structures within the professional organization where a new digital technology will be used.

This study is also informed by Taylor's (2003) description of "nodes" and IJsseling's (1976/2008) concept of a "web of meaning." According to Taylor, "the network as a whole is a network of networks" (p. 155), containing connection points, or "nodes," that help connect the various networks inside a professional organization and establish a larger, interconnected system of networks. Each node, under Taylor's model of network theory, contains its own level of fragmented individuality. But each cluster of individuals inside the nodes are always influenced by the larger collection of networks informing the work they produce within their own self-actualized professional networks. Additionally, as IJsseling has claimed, "it is better to define literary output, not as the work of an author, but as a *web of meaning* [that] results from a network of previous arguments and assertions and . . . . opens up unlimited possibilities of new arguments and texts" (p. 132). As I demonstrate, by examining the multiple webs of meaning within a professional organization and how information moves between each node in the network, we see overlapping shared experiences within the system. These overlapping and shared experiences provide a focal point for the type of research I argue for here.

To help map how a professional organization's network functions and build a process map, the second methodology I draw on and connect to network analysis theory is a form of narrative-based research simply labeled *storytelling*. Many business communication and management communication scholars and theorists have long used storytelling as a research methodology to study a variety of organizational phenomena, including "leadership, strategy, organization studies, and knowledge management" (Reissner & Pagan, 2013, p. 8). Silverman (2006) has demonstrated how storytelling can be used for marketing research, marketing, and customer service. Scholars such as Denning (2004, 2011a, 2001/2011b) and Parkin (2004/2010) have also offered long descriptions and numerous examples of how storytelling can be used to study and initiate organizational change. Additionally, King (2011) and Drevin and Dalcher (2011) have demonstrated the value of storytelling methodologies for studying how people interact with digital technologies.

Narrative-based methodologies apply to contextualized, organization-specific studies of system development because, as Whitney (1989) has

claimed, "[people] not only create an organizational reality by means of coordinated actions, they also communicate by means of symbols, the most important of which is language" (p. 77). Plus, as Forman (2013) has explained, "with the growing presence of social network technology, employees and external stakeholders (for example, investors, customers, clients) want to be heard—and at the same time have their stories told in their own voices" (p. 5). In this situation, collecting stories works because their informal nature allows members of an organization to talk about their experiences in their own words and in the language used by the organization. As I demonstrate, storytelling can help researchers discover how organization members use digital technologies to complete their work in their own terms.

Although many researchers in business and management communication have characterized a number of types of storytelling told in organizations (Boje, 2008; Gabriel, 2000/2011; Reissner & Pagan, 2013), the methodology I use here specifically focuses on a branch of reflective storytelling called antenarratives. First theorized by Boje (2001), antenarratives have been used by Drevin and Dalcher (2011) to study information system (IS) failures. According to Drevin and Dalcher, "antenarrative is seen as a 'before story' or prenarrative. Most of the stories of the actors involved in an IS failure situation will be of such a nature, that is to say, incoherent, fragmented, and nonlinear" (p. 149). Their description of antenarratives is important to my argument because usability stories, like the examples I include here, are usually antenarratives. They usually contain before stories and rarely, if ever, contain the whole story. But the looking back is important. Both success and failure stories are important, as long they are contextualized, because they help researchers to avoid making the same mistakes, or to anticipate what might work, in similar contexts. In this article, I also demonstrate how collecting antenarratives from potential users can help researchers identify the types of technologies used within a specific node of a professional organization's network.

Engaging users in spontaneous and casual conversations conducted outside the usability lab provides an opportunity for them to share their personal experiences and opinions regarding the digital technologies they have used. The stories they tell, connecting events from their past with those from the present, are more telling than any story gathered in a usability lab could be. The examples I provide here show that these antenarratives users share during casual conversations can be loaded with opinions, which are important because they help reveal why the users like or dislike using a particular digital technology. Those opinions and the implicit layer of

familiarity included in the user-generated antenarratives can be used as generative design aids. As Kostelnick and Hassett (2003) have claimed when discussing the visual design of documents, "imitation benefits readers by matching their experiences and expectations" (p. 73) and "conventions economize the readers' work much as they do the designer's—without conventions, readers would have to make an interpretive fresh start each time they encounter a new document" (p. 75). As in documents, "conventions" can be used to build familiarity in digital technologies, and when these conventions are based on the experiences of users, they can, as my examples illustrate, increase the usability and sustainability of the technologies.

To help illustrate a professional organization's network and the data that antenarrative storytelling can provide, I combine a network analysis with the "postmodern mapping" activities described by Sullivan and Porter (1997), the "activity system" diagrams provided by Spinuzzi (2003), and the "community assets" map devised by Kretemann and McKnight that Grabill (2007) discussed. In doing so, I provide process maps to visualize my collected data that include ways of tracking the flow of information within an organization and toward end users outside the organization. I then demonstrate how to use the process maps to identify stakeholders or potential stakeholders who are included in the processes under study. The process maps also illustrate the directions a product travels between the people who contribute to its publication and the technologies those people use to modify, exchange, or use the information within the organization—the information ecology, to use Spinuzzi's (2003) terms.

One additional type of information researchers can collect from user-generated antenarratives and then represent in a process map is the tools employees use to develop, modify, and distribute their organization's desired material output. In this article, I use the phrase *desired material output* to represent the product an organization is attempting to deliver to its end users, such as physical or digital products, knowledge or information, or even services or online training sessions. Including such tools in a process map can help researchers visualize the type of work completed within each node of a professional organization's network and aligns closely with Debray's (1997/2004) description:

> Among the varieties of organized materials required to materialize organizations must be included a proper orchestration of all the instruments of communication. One can distinguish between (a) *the semiotic mode* (the type of

> sign used, be it textual, imagistic, or audible); (b) *the form of its distribution, broadcasting, or channeling* (linear, radial, interconnected or networked); (c) *its material base* (stone, wood, papyrus, paper, or waves); and (d) *the means of transportation* (of people and messages, via roads, vehicles, infrastructures, and larger systems and industries). (p. 12)

Plus, a process map including the tools individual employees use inside the various nodes within an organization's network provides a visual that researchers can use to identify the types of digital technologies those individuals have shared experiences using.

Although usability concerns drive the mixture of methodologies I outlined, my study did not use any typical usability-based methodologies. In fact, the work I present did not take place inside a usability lab, nor is it an account of usability testing practices that take place in context. Rather, as I mentioned in the introduction, each part of the process I present here is a pretesting activity that researchers can complete before any testable iterations of a product are constructed. So no training in usability testing is required before researchers engage in this type of work, and the methodology I present does not require investing in any specific technologies or building a usability lab. But two of the three systems I include were tested using typical usability methods. In fact, the third system passed through usability testing with a high success rate—yet, it was one of the least successful systems I have ever developed.

I draw on and pull together so many different types of research approaches partly because the products and systems I discuss were all born digital and lived, or continue to live, their entire life cycle as digital artifacts. In each case, there was not one workplace setting where I could set up a usability test and rarely did physical contact with any written information occur. The employees of the organizations I discuss were simply exchanging, modifying, and publishing bits of data that were eventually retrieved online by end users. In fact, at one of those organizations, the employees never met over 95% of their users. More important, all of the systems I discuss were hand-coded representations of an organizational need. In each case, I was either the sole contributor to the system developed or a major contributor to the system's final design. That is, I was not only the developer, but I was also a participant researcher. As such, my field notes as a researcher were sparse and, as I will explain, often only consisted of small lists of product names that were later turned into diagrams like the ones I have included here. To demonstrate this methodology, I describe the system development experience that foregrounds one of my major successes and one of my major failures in system development.

Antenarrative 1: The Tutor Development System

The first system-development experience I describe provides the framework for the methodology I used while developing the interfaces for the other two systems I discuss later. This system was a hand-coded digital product with a 5-year life cycle. Its longevity is important because it was never updated or changed once the system was released to users. Although I did not realize it at the time, how this system was developed is an example of participatory design. More important, part of what made the system successful can be directly attributed to the narrative-based research I conducted before writing the first lines of code required to make the system function.

In 2006, I was hired by the English Department at Georgia State University (GSU) to do Web site development work and serve as part of the department's information technology support staff. During my time with the organization, I worked on a number of different digital design projects. One project included working with the university's Writing Studio to build a digital tutor development system. Before starting the project, the Writing Studio administrators explained that they wanted a digital environment they could use to share announcements with their employees pertaining to the organization and recently released calls for conference proposals. They also told me that most of the visual elements they wanted to include in their Web site had already been created and that the various elements that would eventually make up the site's navigation taxonomy had already been established. Plus, based on the conversation I had with the studio's assistant director, I gathered that they already had a pretty clear idea of what information should be displayed on each page of the system.

To start the project, I sat down with a couple of the Writing Studio's tutors and talked to them about the project their employer wanted me to complete. Talking with them helped me quickly uncover a secondary motive behind what the whole organization wanted from the digital technology. If I had not talked to them before I started designing the digital environment, I might have missed the fact that the tutors also had a few needs and desires for the finished product. For example, they told me that they wanted a password-protected digital environment in which they could talk to each other. They also wanted to upload drafts of their own work so that they could receive feedback from their peers. (Tutors tutoring other tutors is how the assistant director of the studio explained the process.) Once I had talked to the administrators and the tutors, the only stakeholders who would be using the system once it was developed, I had a pretty good idea about what the whole organization wanted. The

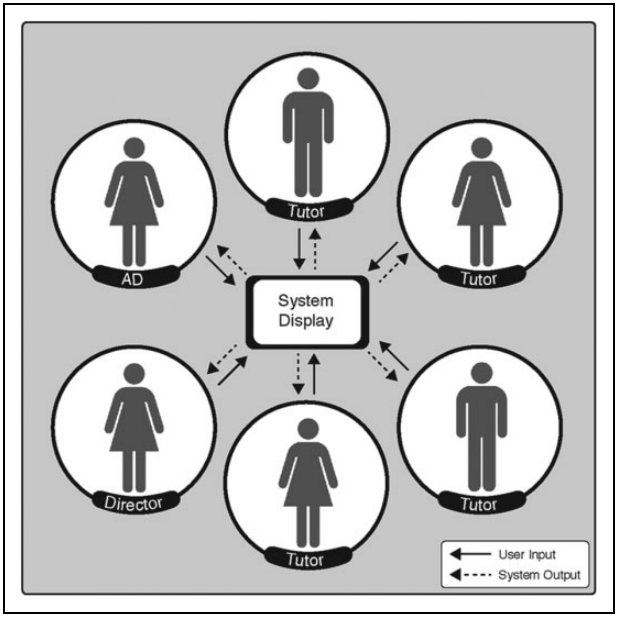

Figure 1. A process map representing how users would interact with the Writing Studio's Tutor Development System. AD = assistant director.

stakeholders wanted to accomplish a relatively simple process with the system. As Figure 1 illustrates, the stakeholders needed to post content, look at the content posted by other users, and potentially post a response to the information they accessed.

Once I had gathered a multivoiced narrative about what the organization wanted from this digital environment, my next step included interviewing the stakeholders to see what type of technologies they were already familiar with using. Here is where a process map, like the one displayed in Figure 1, can help researchers start building the framework for designing a digital technology's interface. As Figure 1 illustrates, every user would eventually access the same display to accomplish a few different tasks. The system's interface would be the one shared digital space that all of the stakeholders would interact with once the system went live. Using a mental version of the process map displayed in Figure 1 as a guide, I focused my predevelopment and pretesting interviews around finding overlaps between the types of digital technologies with which the members of the Writing Studio's professional network had already developed positive personal attachments. At

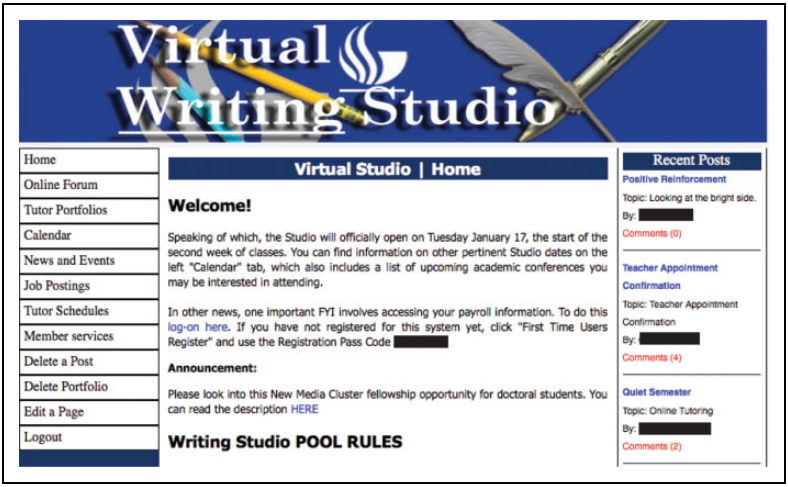

Figure 2. The first page all users would see after logging in to the tutor development system. User names and pass code are blacked out.

that time, everyone in the organization was familiar with using social networking sites like Facebook. So I took a leap of faith and started building a prototype of the digital environment that mimicked the look and feel of a social networking site.

Once I had a prototype, I shared the design with the writing studio administrators and a few of the tutors. Except for a few minor revisions, the stakeholders liked the prototype, and because it would function like a social networking site, they had a pretty clear understanding of how someone might use the digital environment. Once representatives from each of the user groups had approved the basic layout of the digital product, I started building the rest of the system around my prototype. But the true beauty of the final product, as illustrated in Figures 2 and 3, was that the visual display of the interface the users would use to negotiate the digital environment was completely designed, from start to finish, from the suggestions of the stakeholders themselves and their own experiences using other digital technologies. I left GSU in 2007, but the system I built for the Writing Studio was used until June 2011 without any changes being made to the site's design.[2] For 5 years, then, the digital environment remained a viable system for the writing studio administrators and tutors—two stakeholder populations that, with the exception of the organization's director, changed regularly throughout the product's life cycle.

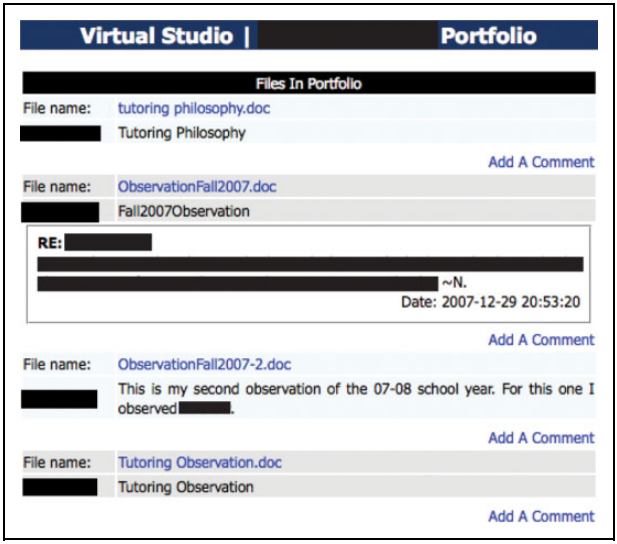

Figure 3. All registered users were provided their own social feed, or mini profile page, in the tutor development system that would grow as they added their own posts and received comments from other registered users. Identifying information is blacked out.

From my system-development experience at the Writing Studio, I learned just how important it is to understand the network of people surrounding a digital technology when designing a workplace-specific technology. Looking back through the lens of Taylor's (2003) description of nodes, I see that what the Writing Studio administrators and tutors were actually looking for went beyond the digital product they wanted. As Figure 1 demonstrates, the system I developed would become its own smaller network. The smaller network surrounding the system I developed would become part of a new node inside the organization's already well-established professional network.

Part of what I also learned, from a technological perspective, is how a poorly coded system can still gain traction within a professional organization as long as the finished product meets the needs, desires, and expectations of all the product's stakeholders. Completing the Writing Studio project helped me understand how unimportant the code running a digital environment can sometimes be and how important stakeholders are when it comes to the digital environment's sustainability. The process I used

throughout the Writing Studio project allowed me to socialize the design-and-development process of the system's interface. Every aspect of the front-end display of the digital environment was either produced by the stakeholders or based on their shared experiences using digital technologies outside of their workplace environment. But as I explain in the next section, I was also left with a pressing question: Could the same approach be used with a much more complex process and a much larger network of end users?

Antenarrative 2: The Content Management System

My second system-development experience demonstrates how I incorporated what I learned during the Writing Studio project into the processes I used to develop a much more complex system. Like the Writing Studio project, this system is a hand-coded representation of organizational need and, at the time of this writing, is still being used by the organization. The system-development experience I share here is only a small, but highly important, portion of a much larger usability project.

In 2008, I was hired to serve as the webmaster for the Online Writing Lab (OWL) at Purdue. The OWL at Purdue is a professional organization with a long history of sharing material on writing instruction with instructors and students in many different countries. According to the organization's 2014–2015 annual report, the organization's Web site "served 345,983,269 page views" (Purdue Writing Lab and Online Writing Lab, n.d.). One of my major responsibilities during my 3-year tenure with the organization was completing a massive redesign for the organization's Web site and developing a new taxonomy to handle the organization's more than 800 individual Web pages. Finishing both tasks also required updating the database that supported the organization's Web site and modifying the homegrown content management system (CMS) that the organization used to manage both the database and the Web site. As I will explain, modifying the organization's CMS unearthed a hidden and unexpected usability issue.

When I began modifying the organization's CMS to handle the changes I was making to the Web site, I started to see a pattern emerge. Part of what I built into the Web site's new design was a way for users to visualize the navigation taxonomy of the site. To make the design work, I needed to include a brief summary for each section, subsection, and individual resource connected to the Web site. (I was attempting to make some of the page designs look similar to the results pages of contemporary search engines). To complete this step, someone from the organization needed to write new summaries and then enter them into the organization's

database. Plus, older summaries already attached to resources needed to be edited, updated, and reentered into the database. Editing the database and the forms used inside the CMS to handle the new information needs of the Web site redesign was a relatively straightforward process. But using the CMS to enter the data into the database required a lot more effort than what I had expected.

Updating the organization's database, although time-consuming, should have been a simple process of finding a specific resource within the CMS, copying the summary text and pasting it into a form field, and then hitting the update button. After watching the content manager try to complete the process a few times, it dawned on me that the process itself was complicated by the fact that the content manager was having trouble finding specific pages inside the CMS. The problem that the content manager was facing was not related to the system's functionality because once a specific resource was found, the process only took a few mouse clicks to complete. The breakdown, to use Spinuzzi's (2003) term, came from the design of the interface and the way the information was presented to the user. To find a specific resource within the CMS, the content manager needed to click through a series of links in order to load a page containing every resource attached to the organization's Web site and then scroll through a large list of unnecessary information before finding the resource that needed updating. At this point, I had two options: I could either adjust how the content manager found resources in the system or overhaul the design of the CMS. After watching the content manager struggle with a few other tasks associated with the CMS, I decided to start building a new front-end display for the system in order to make every task associated with the CMS easier to accomplish.

I began redesigning the front-end display of the CMS by reflecting on and critically analyzing the processes used to develop the Writing Studio project. As I have discussed, part of what made the tutor development system a success could be directly attributed to how closely the final product matched the vision that users had regarding how it should look and function. Although I could not completely match that same level of participant product development because the users of the CMS did not already have a redesign concept in mind, I knew I had to somehow bring their experiences into the design or risk either developing a new interface that the members of the organization would reject or, worse, designing an interface that users found even harder to navigate. To gather such experiences for the CMS redesign project, I first needed to figure out who would be using this redesigned system. Starting with the content manager in the

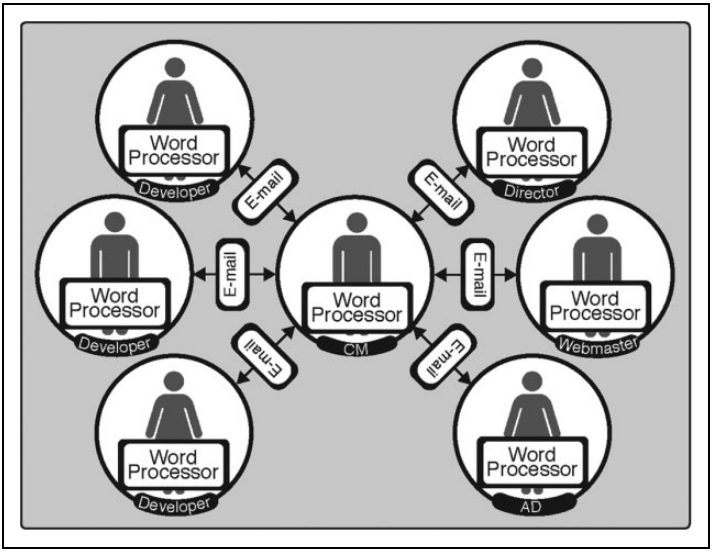

Figure 4. A process map visualizing how, and with what technology, members of the OWL at Purdue exchanged organizational information outside the organization's CMS. CM = content manager; OWL = Online Writing Lab at Purdue; CMS = content management system; AD = assistant director.

center, I added stakeholders to a process map (see Figure 4). Then, rather than focusing on the tasks users would need to complete while using the CMS, I started tracking how stakeholders communicated with each other about organizational issues and practices not affiliated with the CMS.

At this point in the process, storytelling, specifically antenarratives, became a critically important part of how I ended up completing the CMS redesign. As in the Writing Studio project, the next step did not include any design work or coding. Instead, I began asking stakeholders about the types of digital technologies they used inside and outside of the workplace. When I started talking to the stakeholders, our conversations were unscripted and purposefully not recorded. In fact, most of those conversations happened organically and took place randomly in hallways, during bus rides home, or even on a street corner on the way to work. Listening to stakeholders describe their experiences in a casual setting without the pressure of being recorded helped me to hear things I had never heard, or have yet to hear again, in a formal focus group. Underneath the expletives that they often used to explain their frustrations with, and sometimes hatred for, digital

technologies were descriptions of some major usability issues that they were encountering with popular commercial technologies.

The reflective stories I started gathering from stakeholders were extremely important to my study because they were gut reactions based entirely on memory. During our casual conversations, the stakeholders did not have any technology in front of them to explore while they spoke. All of their descriptions reflected the worth they had associated with the digital technologies they were describing. Those spontaneous, usually fragmented, imprecise, and highly personal stories of use were connected to actual events from the stakeholders' past and, at the moment of sharing, were truer to these stakeholders than any story I would have gathered in a usability lab. Accessing stakeholders' memories unlocked their feelings regarding these memories, which were important components of my study. Those gut reactions and feelings regarding other digital technologies would be the same memories these stakeholders would access when they visually examined and attempted to use the system I was developing.

Directly following each casual conversation I had with a stakeholder, I jotted down the names of the digital technologies the stakeholder mentioned. After a few conversations, it became clear that each stakeholder I talked to had different levels of experience—and different levels of satisfaction—working with a variety of digital technologies. But hidden in my lists—usually composed on the back of old receipts, napkins, or any other scrap of paper I could find—was an emerging pattern of shared familiarity with at least two specific digital technologies. Once I realized the pattern, the lists I created got shorter and shorter until I got down to word processors and the university-sponsored e-mail client. At that point I stopped creating lists and instead simply focused on verifying that each stakeholder I talked to was familiar with using a word processor and that university-sponsored e-mail client.

To recheck my findings and verify what I had learned, I went back to the stakeholders and started updating my process map. As Figure 4 illustrates, each stakeholder group used a word processor and, as the arrows indicate, communicated with each other within the university-sponsored e-mail client. This shared familiarity was something I wanted to include in my design. I knew I wanted the CMS's redesigned interface to match one of the technologies I had added to my process map, but I did not determine which technology to mimic until I conducted a follow-up interview with the organization's director—one of the most inexperienced members of the organization when it came to using digital technologies. During the follow-up interview, I noticed the director had her university-sponsored e-mail client loaded on her computer screen. When I asked her if she found

the system easy to use, she hesitantly said yes but added that it was only easy to use because she used it almost every day.

Such familiarity was what made the university-sponsored e-mail client functional for the organization's director. She knew where the actions menus and items she used often were located in the interface because accessing those features of the system had become habit. Based on this conversation with her, and the casual conversations and personal interviews I had with other stakeholders, I started building a design for the CMS's interface that mimicked the university's e-mail client. My reasoning was simple: If I could develop an interface that functioned like a system the stakeholders were already using, I could tap into their already-developed habits. I wanted stakeholders to see that the "conventions," as Kostelnick and Hassett (2003) discussed, of the university-sponsored e-mail client were at work in the CMS interface when they first started exploring it so that they would not have to make "an interpretive fresh start" with the new design (p. 75).

After sharing a few mock-ups with the content manager, I presented my designs to the director and the assistant director. Once they approved the design concept, I started building a new interface for the CMS. During this part of the process, I worked directly with the content manager using iterative design testing.[3] I then tested the final product during a separate usability study with other organizational stakeholders, made some adjustments to the system based on this usability study, and went live with the interface design (see Figure 5). Six years, three webmasters, and three content managers later, the CMS, at the time of this writing, is still being used by the organization.

As one former content manager (Content Manager B) explained when I revisited the site, the system "was pretty quick to pick up and use[, and] when you are talking about a position that is only supposed to be 10 hours a week . . . saving time means a lot because we can get more done with the time we have" (personal communication, May 22, 2013). More important, Content Manager B claimed during this interview that he only needed 15–20 hours of training before he knew how to use the system to perform all of his job-related activities. Learning how to use the system, according to him, took less time than it took the previous content manager to add and update summaries for the Web site's content before I had redesigned the CMS. This is a significant change because the organization uses the CMS not only to manage its online content but also to communicate with end users, manage the organization's content developers, and perform many other mundane administrative tasks.

When I reflect back on the experiences I had redesigning the interface for this CMS, I usually think of the conversations I had with stakeholders and how a similar product development approach could help other small organizations

Figure 5. A screenshot of the redesigned CMS interface. CMS = content management system.

that want homegrown data-management solutions. The interface design I developed for the CMS was based on the stories told by stakeholders about their responses to using other digital technologies. As my example in this section helps to illustrate, using the stakeholders' stories of use was an effective first step in determining how to develop an initial prototype of the application. Integrating a design concept that the users were already familiar with also provided inspiration for an interface design that did not impede how information was conveyed to users. Ultimately, I was able to achieve a similar level of participant design and sustainability as I did during the Writing Studio project. As I will explain, the approach I took to redesigning the CMS interface also helped me identify what I thought was a separate usability issue concerning how the organization developed new content for its Web site.

Antenarrative 3: The Content Development System Failure

My final system-development experience demonstrates an attempt to usability test the process used by a professional organization to develop,

edit, and manage its growing collection of online content. I call this the organization's *mediation process*. Unlike my other two examples, however, the system-development experience I share here illustrates what can go wrong when a usability researcher misinterprets a usability concern with what the users view as common practice in an already well-established workplace environment. The type of research I advocate for throughout this section is important to my overall argument because it can help a usability researcher or UX developer understand what is truly causing a breakdown in a complex and completely digital mediation process. Although this story centers on a system-development failure, it shows that by using the mixed-method approach, I was better able to understand where I failed and that this approach highlights an issue with usability research that other researchers should acknowledge when faced with a similar challenge.

While testing the redesigned interface for the CMS, as outlined in the previous section, I noticed an issue with how the content manager collected, edited, and posted content to the organization's Web site. So once I had finished redesigning the CMS's interface, I closely examined the mediation process used by the content manager. When I began the study, the content manager first had to open an e-mail client, locate an e-mail from a content developer, and then download an attached text-file version of the resource. The content then had to be opened in a compatible word processor application, verified, proofread, and sometimes edited. If the content manager was satisfied, he would then open the CMS and use that system to code it in HTML before adding it to the organization's database. On the other hand, if the new content needed a lot of edits or revisions, the content manager would mark up the requested changes using a word processor, save the document, and then send it back to the content developer as an e-mail attachment. The time spent working on the content outside of the CMS seemed like a problematic, time-consuming, and unnecessary additional step in the process.

Even though I did not know where the problem I had identified was originating—or why the content manager performed the actions he did—I did know that I would not be satisfied with the work I completed for the organization until the problem was addressed. At the time, I thought the issue was a usability problem with the CMS and could be fixed. But initiating a usability study of the process proved to be problematic. I did not know what part of the CMS should be tested or what other technologies included in the process needed testing. It became clear that to address the usability issue I thought I found with the CMS, I actually needed to

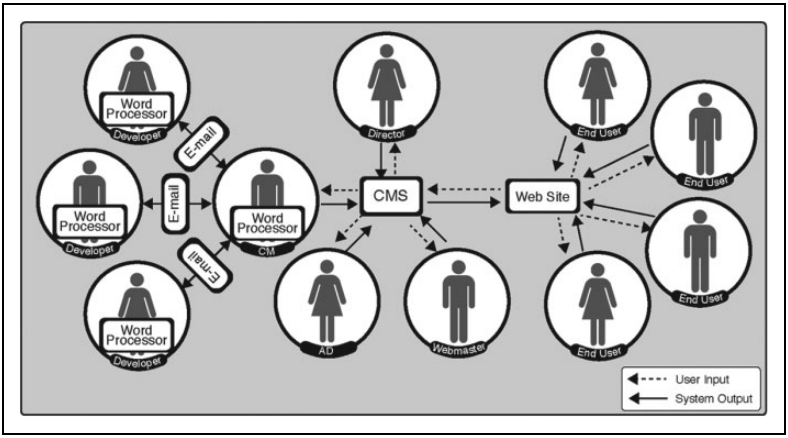

Figure 6. A process map of the content-mediation process used by the OWL at Purdue to develop, edit, and deliver material to end users. CM = content manager; AD = assistant director; OWL = Online Writing Lab at Purdue; CMS = content management system.

develop a way of tracking the entire mediation process that the organization used to publish material. In other words, to make my digital design study work, I first needed to find a way to figure out how the organization functioned.

In doing so, I faced an interesting dilemma. I needed to find a way to track the digital processes of an organization's employees who did not use one specific application to complete their work or one specific delivery system to exchange their work with other organization members. The major problem I faced was that correspondences between the employees were almost entirely completed by using digital technologies inside an almost unlimited number of physical places. That is, the process I was attempting to study was not something I could effectively test by using traditional usability methods within a usability lab. After some trial and error, I found that the easiest way to produce a representation of the organization's mediation process was to start with one final product and work backward. As Figure 6 illustrates, and as I explain below, I used storytelling to map out the entire process, from inception to distribution, that stakeholders used to present material (output) to their end users.

To begin tracking the mediation process, I focused on one of the most popular sections of the Web site at the time, the organization's American Psychological Association resources, and worked backward. I started by

talking to a representative group of the organization's end users and started collecting stories of use from each of the stakeholders I identified at each step in the mediation process. Working backward through the process helped me record the various factors, operations, edits, people, and technologies included in the processes used by the organization to mediate its output. By tracking and then adding the information I was collecting from the stakeholders to a process map, I was able to see how the organization's desired output arrived at its destination, where this information came from, and what technology, or multiple technologies, were used in the process. As Figure 6 illustrates, while tracking through this mediation process, I discovered that a number of stakeholders were involved.

Besides stakeholders, I discovered three interconnected but individualized information exchange nodes that had developed within the organization's mediation process. The first node I identified, which included all of the organization's employees and its end users, had clustered around the organization's Web site. The second node, which included all of the organization's employees, had clustered around the organization's CMS. The third node, which only included the organization's content manager and content developers, had clustered around the use of e-mail clients to exchange information. Once I had filled my process map with the various user groups included in the mediation process, I started examining what was happening in each of those information nodes. What I discovered was that all six stakeholder groups identified in Figure 6 could make suggestions about new resources. All the stakeholder groups also had their own way of passing information regarding errors they found in the resources already mediated to users clustered around a different node in the network.

As Figure 6 highlights, information pertaining to the mediation process was coming from many different sources and being passed through many different use situations. The one common overlap was the organization's CMS. The end users were getting information from the CMS by accessing the Web site and using the Web site to pass information back to the CMS. The administrators of the organization were using the Web site but were also accessing information from and pushing new content to the end users by accessing and using the CMS. By working my way through the entire mediation process, however, I discovered that the one stakeholder group without direct access to the CMS was the content developers because, as Figure 7 demonstrates, the content that they developed had to pass through the content manager before it was entered into the CMS. This discovery seemed to verify that the breakdown in the process I was hunting

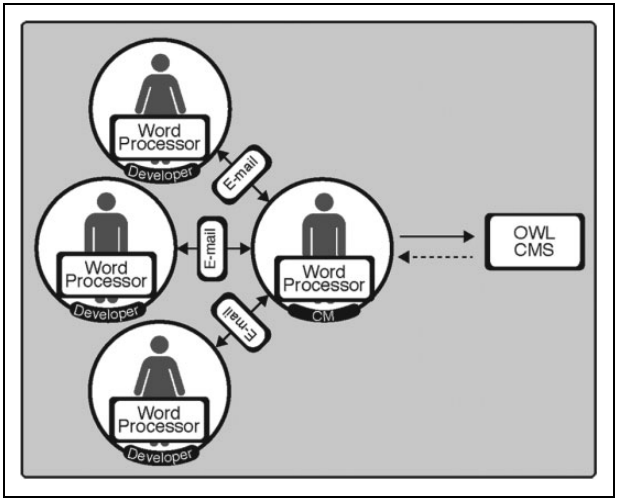

Figure 7. A process map of the information node that had developed around how the OWL at Purdue's content manager and content developers exchanged information. CM = content manager; OWL = Online Writing Lab at Purdue; CMS = content management system.

for was originating within the information exchange node that included the content manager and the content developers.

Unfortunately, once I had verified, or thought I had verified, what I had predetermined to be a usability issue, the system developer in me took over. I mistakenly stopped exploring the mediation process used by the organization and started sketching out a design concept for a system to replace the use of an e-mail client and word processor inside the information exchange node (see Figure 7). After talking with the content manager and pitching my idea to the director and assistant director, I started gathering the same types of antenarratives from the content developers that I had collected to complete the redesign project I discussed in the previous section. After verifying that the content developers had experience using the university's e-mail client and a word processor, I started building a content development system that would require little HTML coding to use and that mimicked the design of both of those applications. I then tested the functionality of the new system in a series of Institutional Review Board (IRB) approved, task-based usability tests (Purdue University IRB Protocol #1102010463). After usability testing the system I developed, I made some changes, retested the system, and, after reanalyzing the data from the usability tests, determined

that the content developers could effectively use the system to complete the activities it was designed to help them accomplish.

Just as I was about to release the product and officially add it to the mediation process used by the organization, I decided to sit down with the content manager one last time to talk about logistics. In talking with the content manager, I realized I had made a huge mistake. I had developed a system with a familiar interface. The system had passed through a series of usability tests and allowed users to complete the tasks it was designed to help them accomplish. But unfortunately, excitement for the project within the organization had dwindled. In my zeal to find and "fix" a usability issue with a digital technology that I had spent so much time developing, I had overlooked an important aspect of UX development and about the organization: The organization's content developers were freelance contributors. Although they were getting paid for their service, they were working voluntarily, and most of them were not planning to become digital content experts or even professional writers. A large number of the contributors were studying literature or linguistics and wanted to become literature or linguistics professors once they graduated. The content developers were content experts, but most of them had little, or no, experience converting their writing into digital artifacts or coding even basic HTML.

It took some time, but eventually I realized that part of why my content development system had failed—even after it had passed through a series of usability tests—was because I had deviated from the research process I discussed in the previous section. Instead of working through the entire process, I had stopped analyzing the organization's mediation process once I had discovered a "breakdown" and started asking an important stakeholder group the wrong questions. What I had attempted to do was close to what Gordon (1990) suggested:

> If a company attempts cultural changes that are, in fact, not consonant with the requirements of the industry, people will tend not to have successful experiences with actions leading from the new values and only become more entrenched in their opposition to cultural change. (p. 91)

In other words, I had unknowingly attempted to situate within an organization a product requiring skills, specifically in basic HTML, that were not part of the content developers' normal or future workplace activities. By not tracking the mediation process back to its beginning and asking enough of the content developers why they used a word processor and not an HTML editor to develop their content, I had

mistakenly forced the content developers to adopt a system that did not match their previous experiences.

If I had continued with my plan and forced the content developers to adopt the system I had developed, I would have been forcing them to learn a skill they did not need in their desired employment path. Thus, the system would not have simplified the organization's mediation process. Because a large portion of the content developers had no experience working with HTML, the content manager would still need to go in and verify the users' code. Plus, the "What You See Is What You Get" editor used in the organization's CMS and the content development system I had developed was unable to handle some of the code requirements that the organization needed to properly format its content. Therefore, unless every content developer had some experience or training in basic HTML and our in-house coding, the content manager would still need to go in and add this in-house coding to almost every resource before it was added to the organization's Web site. If I had taken the time to engage in the types of casual conversations I had gathered during the CMS redesign project, I would have arrived at this conclusion sooner. Instead, I learned everything I described in the last three paragraphs from casual conversations I had with the content developers after the decision was made to not release the product I had developed.

Although the mediation process used by the organization before I began my study was not the most efficient or effective, it was not directly related to a usability issue with the CMS. The process was closely aligned with familiarity, and changing it would cause a significant financial concern. Training every content developer to add HTML code to their content was not a viable or cost-effective option for the organization. In fact, if the organization started training their content developers to code basic HTML, it would eventually lose money because a lot of its content developers would only develop one or two resources. Additionally, there was a high turnover rate for content developers within the organization because they were graduate students. If knowing or learning basic HTML were a job requirement, the organization would need to constantly train new developers or, worse, would lose potential candidates who have an incredible wealth of content-specific knowledge but do not want to go through the process of learning a new skill. Regrettably, I left the organization before I had the opportunity to readdress this "breakdown" in the mediation process. But by finding it and proposing a possible alternative, I left the organization knowing that something could be done to make its mediation process more effective, which was something that the organization did address after I left.

Further Discussion and Research

In this article, I have included three antenarratives based on my own system-development experiences to illustrate why collecting antenarratives from users is an effective addition to UX product-development practices. The stories and experiences I have included here have their own unique qualities and a number of commonalities. First, each system-development experience builds an argument for the importance of storytelling to the process of developing digital technologies. Collecting users' antenarratives works as a component of a UX product-development plan because, as Groh (2005) argued, storytelling as a methodology is about "giving power away" and "making everyone else more powerful" (p. 163). To me, the idea of "giving power away" is a fundamental component of UX system-development practices. Plus, as Boje (2008) claimed, "narratives shape our past events into experience using coherence to achieve believability" (p. 4). The connections Boje drew between storytelling, sense making, and experience are part of what makes storytelling an attractive and effective component of usability studies conducted in professional contexts.

Admittedly, researchers will probably not be able to use every story they gather from stakeholders in unscripted conversations outside a usability lab. But collecting such stories as a predevelopment data collection practice is one reliable method of getting a product's eventual users to describe in their own words how a product's interface design should look so that it will match their actual needs. Collecting stakeholder stories of use—especially stories about the different technologies they have used outside the workplace—can also help the developers of digital environments create more sustainable products. Getting users to share their stories and using those stories as generative design aids are participatory activities. During the Writing Studio and CMS redesign projects, I engaged the stakeholders in a dialogue regarding the system that they wanted developed, so the users' self-described needs were the driving force behind their designs from start to finish.

Second, each system-development experience shows how important it is to study an organization's mediation process when developing technologies that support that process. As I have demonstrated, starting with an analysis of the mediation process rather than of the usability or materiality of a finished product provides a way to track all of the stakeholders in an organization who contribute to the development of the final product. Then, by generating a process map, researchers can start to see how every use situation within the professional organization is connected to an elaborate

and complex collection of other use situations. From a digital design and usability standpoint, analyzing a professional organization's information-exchange network can also help researchers understand how the individual nodes within the network overlap and commingle. It can help researchers identify those individual nodes and understand how the overlaps between those nodes often form elaborate, complex, and unique information ecologies.

But how an organization is held together and how information travels through those information exchange nodes will be just as unique as the organization's desired material output. And a professional organization's network changes over time. As Galloway and Thacker (2007) claimed, "networks are reconfigurable in new ways and at all scales. Perhaps this is what it means to be a network, to be capable of radically heterogeneous transformation and reconfiguration" (p. 61). As my Writing Studio experience (Antenarrative 1) demonstrates, developing new workplace-specific technologies for an organization can potentially create new nodes within the network. This can, of course, be a positive change within the organization or, as my experience with the content development system (Antenarrative 3) highlights, just the opposite. The addition of a new workplace-specific technology does not guarantee a positive change and could actually make the mediation process more complicated for employees. What the mixed-method approach I present can provide researchers is the ability to anticipate how making changes to one node could affect the entire network so that they can potentially avoid creating new breakdowns within the system.

Although my research can help researchers find where breakdowns in the process might be occurring, unless they examine the entire development process, additional complications could creep into any development situation. Collecting stakeholder stories and understanding the language an organization uses to describe the various stages of its own mediation process can help researchers avoid mislabeling a breakdown as a usability issue and trying, as I did, to force an unnecessary technology into an already overly complex mediation process. If they do not explore the entire mediation process, researchers might miss an important step in the process and unknowingly force users to use a technology or production process that they simply do not understand, have no experience with, or have no motivation to learn. Creating a process map as part of a predevelopment plan can instead help researchers spend more time exploring options that better match the context of the employees' actual job requirements.

Third, and most important, in each of the system-development experiences I have shared, I was actively engaged with the users. The CMS

redesign project (Antenarrative 2) helped reaffirm something I had learned while working for the Writing Studio. By working in isolation, or developing out-of-context digital technologies, digital design researchers might be able to create a functional product. But in order to develop a product with a high level of sustainability, researchers first need to find a way to socialize the design process itself. By socializing the design and development processes, I began to see myself as a situated component of the mediation process used by both of the organizations I have identified here. I was able to see how the work I did affected the lives of real people. I was also able to see how the context surrounding digital designers' use situation will always be partially shaped by their experiences, or lack of experience, working with any other professional organization. If researchers do not already occupy a role in the workplace they intend to study, the first step they should take before initiating the study, based on the research model I have presented here, is to get to know the stakeholders. Researchers should also make every attempt to get the stakeholders to view them as part of the process and not as an outsider looking to replace a process that the stakeholders do not see as broken.

As I claimed in the introduction, cost is a concern embedded in this research model. The organization will need to pay someone to do the research and design the system. But with no initial software investment or specialized training required, the mixed-method research model I have presented can be a practical, cost-saving activity. By connecting the design of a digital product's interface with a technology that users are already familiar with, the model reduces the cost of training people how to use the finished product. It can also help an organization to avoid spending money developing a system that its employees might never use or that would add additional training costs to an already complex mediation process. And because collecting stories requires no training in usability or system development, most of the predevelopment work I have outlined can be performed internally before the organization hires someone to build and then usability test the needed product.

As my examples have demonstrated, using the democratic design process when developing digital technologies not only works; it helps smaller, nonprofit, grassroots organizations with a limited development budget to save costs. But before the term UX becomes as ubiquitous as other terms used to identify theories of user-focused product development practices and methodologies (see Johnson, 2010), we, as a community, need to continue exploring what types of user experiences should be included as viable, reliable additions to our research and development practices. Larger

usability-based studies associated with storytelling in larger organizations need to be conducted so that users' needs continue to forefront our theories and their experiences remain the foundation of our research and development practices. I have offered one method to increase user involvement and expectations, both based on experience, when it comes to developing digital technologies. This method is not intended to replace what we already know about usability, user-centered, or participatory design practices but instead fits well with already-established approaches and rhetorically grounded studies of usability.

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1. Of the three systems I discuss, one was shut down after being used for 5 years, one was still running at the time I wrote this article (having at least a 6-year life cycle), and one was a fully developed, tested, and functional system that was unfortunately abandoned before it was released to users.
2. Although I left the organization, I retained administrative access to the tutor development system. In 2012, the system contained news items and tutor comments with a May 2011 date stamp.
3. The content management system was tested, in part, using a similar process to the type of Agile development practices King (2011) described.

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