

Affecting Sustainable Living by Incorporating an Understanding of Time in the Lives of Digital Natives

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ABSTRACT

In this paper, we respond to the Call for Participation for the CHI-Sponsored Workshop, “Simple, Sustainable Living.” Particularly, we address the guiding workshop questions through focusing on the relationship between cultural constructions of time and patterns of sustainable or unsustainable technology use. We argue that careful examination of one of the fundamental institutions—i.e., education—in which we learn culturally-sanctioned norms about time, inherently tied to busyness and sustainability, can offer a day-to-day view of the challenges, choices, and opportunities that individuals confront with regard to sustainability and busyness [21]. Additionally, problematizing the technology use patterns predominant at educational institutions has shown significant promise in previous research [26] and affords researchers possibilities for on-the-ground and long-term access to digital natives—a valuable population to consider as we move forward in designing IT to support more sustainable lifestyles, associated with mindfulness in our daily activities.

Author Keywords

Time, separation, connecting, sustainability, digital natives.

1. RELATED RESEARCH BACKGROUND

Each of our co-authors has conducted research related to the theme of this workshop, centering on the relationship between technology use and sustainability. Dr. Dawna Ballard’s scholarship has featured systematic inquiry on the experience of time in the workplace as shaped by technology use, through a series of empirical studies [6, 8, 10] and related theoretical frameworks [4, 5, 7]. Her conceptualization of organizational temporality explicitly addresses dimensions of busyness and sustainability. Dr. Matthew McGlone is a cognitive psychologist with expertise in instructional communication. He is currently conducting a longitudinal study of instructional technology’s potential for shaping middle school students’ “metacognition” (i.e., their grasp of how their minds process and store information) for the U.S. Department of Education. Dr. Keri Stephens studies workplace and student use of technology and has recent publications examining email use between faculty and students and smart phone use as distractions in organizational meetings [41, 42].

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2. KEY ISSUES AND OPPORTUNITIES

2.1 Importance and Theoretical Background

The capacity of modern communication technologies—often multi-function, mobile devices—to connect to information and to others at any time and from any place offers a wealth of opportunity for learning and engagement. However, a growing body of scholarship suggests that this vast connection has also added unwanted complexity to our lives, challenging our ability to maintain a state of mindfulness amidst the connectedness. The literature on the human experience of time, or temporality, offers a potential blueprint for investigating this relationship and considering designs for IT that support more sustainable lifestyles and mindfulness in our activities: Consider how and what group members learn about time in their day-to-day lives.

Hassard [21] argues that members of a given culture are taught sanctioned constructions of time through their early membership in two cultural institutions: religion and education. From this vantage point, then, it appears that one site where potentially powerful shifts in cultural norms regarding simplicity and sustainability can be made, is in the classroom. While the relationship between technology use and sustainability among members of the full-time working population has been studied for some time, it has only recently achieved attention among the Millennial generation still in the classroom [26].

Despite the extraordinary capacity of information and communication technologies to expand our horizons, research shows that inside the space and time of a classroom meeting these same technologies are increasingly associated with busyness, intellectual disengagement, and mindlessness [17]. Rather than helping to simplify students’ lives, technology creates an unintended complexification as they seek to manage conflicting domains of life—from scholastic to social—within the confines of class with multiple windows open and numerous devices chirping for attention. What is most notable is that these same studies indicate that students also see this busyness as an important problem and are troubled by their inability to simplify and dis-connect given the many social pressures and norms that they face [26]. This problem for digital natives may arise due to the fact that traditional models of classroom organization are not well suited for the changing roles of technology in students’ lives [3, 37].

We believe this population and setting provide an opportunity for scholars and practitioners interested in simplicity and sustainability associated with technology use. Notably, considering their activities and interactions in the educational setting may help predict the challenges and approaches they bring to their professional lives. Accordingly, we offer some theoretical background for a time-based

view of these two underlying values (simplicity and sustainability) as we describe the work on two dialectical constructs relevant in interaction with and around communication technology: connection and separation. Ultimately, we argue that a balance between connecting and separating allows persons an opportunity to minimize the “complexification” often accompanied by IT through preserving the mindfulness that is truly critical in educational and other knowledge work settings. Specifically, we focus here on a temporal concept introduced by Ballard and Seibold [7], called separation. While it was developed to consider organizational communication processes, it applies to work and non-work contexts as well.

Separation is a measure of spatiotemporal connection, or availability, among persons. It is an index of the degree to which extraneous factors (i.e., interruptions) are eliminated or engaged in the completion of tasks, and is evidenced in the physical and psychological protection or availability of persons’ time and space. Under high levels of separation, extraneous factors are interpreted and discursively represented as unwelcome interruptions. Behaviors such as closing the door or not answering the phone are common enactments of separation. Low levels of separation—i.e., high connection—are evident in practices like the open door, discursively or literally used to communicate less restricted spatiotemporal norms. On one end of the continuum, separation is signaled in spatial and temporal barriers to interaction, whereas on the other end of the continuum, connection is signaled in the removal of the same barriers as a way of facilitating interaction.

Ballard and Ramgolam [9] introduce a typology of the various types of spatiotemporal enactments associated with different interaction genre repertoires at work [33]. Interaction genres refer to a “socially recognized type of communicative actions—such as memos, meetings, expense forms, training seminars—that are habitually enacted by members of a community to realize particular social purposes...” In the following sections, each of four genre repertoires—*separating*, *screening*, *commuting*, and *connecting*—are described in turn. Note that this is not a typology of technologies. Rather, it illustrates how the same technology (from mundane to cutting-edge) may be appropriated in more than one way based on users’ needs.

2.1.1 The Connecting Genre Repertoire

The greatest level of spatiotemporal availability is reflected in the *connecting genre repertoire*, wherein individuals are present in space and available in time. In his original treatment of monochronic and polychronic time, Hall [19] wrote about office configuration as one of the most visible signs of culture. In polychronic cultures where connecting to people is afforded priority over task completion, office spaces are huge open rooms where all are welcome to congregate and interact at once. Similarly, the open door has long been another cultural symbol of availability in many Western organizations.

In an environment characterized by virtual teams, virtual organizations, independent contractors, and telework, the open door of yore has been replaced by the technological equivalent. For example, mobile phoning to micro-coordinate [27] en route to a meeting while on the same corporate campus or in the same vicinity is a familiar occurrence [41]. Texting is also being used as a tool to strategize, and subversively change coalition strategies,

during face-to-face meetings with co-located colleagues [41]. While connecting is critical for human interaction, an overemphasis on connection to the exclusion or marginalization of other types of spatiotemporal forms/enactments is not sustainable over time.

2.1.2 The Commuting Genre Repertoire

A good deal of availability is also reflected in the *commuting genre repertoire* wherein individuals are absent from others in space but desire to interact synchronously (or a close approximation of it) in order to signal their temporal availability to others. Within a commuting genre repertoire, various technologies are appropriated to extend oneself in space while connecting with others in real time. Often this physical absence is desired, as in the case of an arranged teleworking agreement [5], but this genre repertoire might also apply in a variety of other settings.

The term commuting does not apply only to those in formal telecommuting situations, but is commonly enacted by members throughout the organization [35]: This includes working from home at the end of day (after leaving the office), being on-call over the weekend, and being generally available after hours (despite the day or time). Independent contractors and freelancers often find themselves in this situation as well. Both the connecting and commuting genres tend to be over-utilized by organizational members and cyclically contemporary IT often follows the same trend. Ultimately, organizational members may find themselves having little time outside of the purview of work—either *connecting* or *commuting* for much or all of their waking hours.

2.1.3 The Screening Genre Repertoire

Less spatiotemporal availability is reflected in the *screening genre repertoire* (compared to the commuting genre) wherein individuals are absent from others in space and desire access to asynchronous communication means in order to manage their time. Screening enactments are appropriated to help manage the ebb-and-flow of communication in time and space.

Old-fashioned (i.e., listen-while-you-decide-to-answer) answering machines are less prevalent in the workplace (and elsewhere) today, but they were appropriated as a screening device early in the information era [23]. Pagers and Caller ID were also some of the earliest screening technologies [8]. In

the case of pagers, there is always a slight degree of asynchronicity, yet it is common for group members to return calls promptly. Caller ID permits members to selectively screen contacts, deciding in the moment whether or not to be available. Electronic mail (e-mail) can be used as an asynchronous media that permits individuals to screen out communication when they are unavailable. Often, however, enabled by “push” email and “pinging” by one’s email client, organizational members treat email as an almost synchronous communication media.

2.1.4 The Separating Genre Repertoire

The least amount of availability is reflected in the *separating genre repertoire*, wherein individuals are present in space, or co-located with other colleagues, but unavailable in time. The practice of separating is appropriated to protect time (despite the availability in space). The classic, yet low-tech, communicative strategy to enact separating is simply closing one’s door at the

office [6, 19]. This is similar to the way that, while counting a bank drawer, bank tellers display a sign such as “Next Window Please” which signifies to fellow workers, managers, and customers that they are not currently available in “time” to serve or assist others.

Another practice—available regardless of office configuration, but rare in practice—is described in Perlow’s [34] study of a group of software engineers. Perlow used “quiet time”—entire blocks of time wherein group members were not to interact with each other—as a tool to minimize constant interruptions and increase work productivity. Nonetheless, this is not a common technology, and even Perlow’s group soon abandoned quiet time after she ended her study with the organization, despite the success of her intervention. Notably, this genre repertoire contains the fewest examples of relevant workplace technologies—compared to the other repertoires—reflective of cultural attitudes that favor availability in contemporary organizations.

2.2 The Classroom as Opportunity

Questions and concerns about technology’s mediation of spatiotemporal availability in the classroom parallel those posed in workplace contexts. For the past few years, many educational theorists have touted technological advances in general and laptops with wireless connectivity specifically as the next great pedagogical innovations. Brown and his colleagues (e.g., 14) have long advocated the benefits of universal “connectedness” and constant access to computers on college campuses. Much attention has been paid to finding ways to roll out laptop programs and get faculty to adopt and adapt to such programs (e.g., 20, 30). One common theme in materials for these programs has been that if faculty would simply “take to” the new technology, they and their students would reap the benefits of this educational revolution (e.g., 45). The key question then for educational institutions is whether the technological innovations, which typify the connecting genre, will produce the benefits promised.

There is some evidence that laptop usage and the development of “ubiquitous computing” environments on college campuses can have a positive effect on student learning. Some (e.g., 16) have found that laptops can facilitate faculty-student interactions and in-class participation, thus increasing engagement and active learning. This engagement is typically achieved by preparing and posting discussion questions and using new devices such as response keypads to facilitate student interaction. Driver [15] found that laptops, coupled with web-based activities, enhanced satisfaction with group projects and overall class satisfaction. Barak, Lipson, and Lerman [11] demonstrated that laptop use in a wi-fi classroom enhanced active exploratory learning and promoted more meaningful interactions between students and with the instructor in large classes. Other researchers have found that the use of laptops in classes can increase students’ motivation, their ability to apply course based knowledge, and their overall academic achievements (e.g., 28). When compared to non-laptop classrooms, students in laptop classrooms reported higher participation rates, more interest in learning, and a greater motivation to perform well [43].

Although these findings are encouraging, they are undermined by two general shortcomings of the research from which they were derived.

First, much of the research focuses on student perceptions and the research often lacks objective measures of learning or a non-laptop control group. One exception, [18] found no difference between laptop and non-laptop sections in overall class grades. Second, most of the research has been done on classes that have been specifically designed or revised to utilize the technology. Many of the published papers in this area (e.g., 11) are simply prescriptions for how faculty can adapt their classes to make use of the technology. As a result, it is difficult to assess how applicable the laptop research is to more generic classes, or how constantly connecting via laptop use truly affects student learning.

Recently, a bona fide backlash against classroom laptop usage has begun. Schwartz [39] reported on professors so frustrated by their law students surfing during lectures that one faculty member manually unplugged the wireless transmitter, only to relent after student outcry. Others (e.g., 24) likewise describe the distractions posed by laptops, the frustrations felt by faculty, and the various fruitless efforts to control laptop use. Students and parents have begun to discuss the potential problem posed by the access to distracting material available through laptops (e.g., 43). An online discussion group has even formed to air concerns about laptops and discuss the pros and cons of banning laptops in the classroom [47]. The press has reported on efforts at schools such as University of Kansas, University of Pennsylvania, Brigham Young University, and Harvard University to block or reduce in-class laptop use. This backlash, however, is playing out more in the popular press than academic journals, and the evidence against laptop use is often anecdotal and subjective.

That said, research findings in the areas of cognitive science and human factors would certainly lead to the prediction that use of laptops with wi-fi access to facilitate connecting can interfere with mindful learning. Human attention and capacity to process information is selective and limited [22, 35]. Too many sources of information can create cognitive overload, and new information coming in can cause attentional shifts and distraction. Computers and other high-tech equipment which facilitate connecting are likely sources of overload; the orientation and visual nature of laptops and many handheld devices make them inherently distracting (e.g., 31). Inevitably, when attention is divided and attentional demands exceed capacities, task performance suffers. Attentional shifts and cognitive overload can prevent information from being adequately processed and can interfere with learning and metacognitive awareness [2]. Moreover, although attention is often controlled voluntarily, external events and visual stimulation can result in involuntary shifts of attention. Recent research on cognitive interference (e.g., 1) has shown that new information, such as a pop-up messages, appearing while a subject is performing a primary task slows performance speed and increases errors. Because of the vertical orientation of laptops, they also pose more of a distraction to fellow students than traditional notebooks [12]). Thus, the cognitive interference posed by laptops can spread from users to those seated nearby.

Given these findings, there seems to be good reason for educators to have second thoughts about in-class laptop use. Some schools (e.g., Duke) have opted out of laptop initiatives altogether because of unanswered questions about the problems laptops pose and the dearth of evidence that they are an overall valuable learning tool [32]. Others have dropped programs because they have become disillusioned with

the idea that the benefits of laptops in the classroom outweigh the costs [29]. Recently there has been a call for expanded research into the effects of laptops on classroom learning, especially research done in classes not specifically tailored to laptop use (e.g., 13). According to Weaver and Nilson [46], the lack of research, coupled with the high cost of laptop programs, are the primary causes for the backlash against such programs. Melerdiercks [31], in particular, has made an impassioned plea for such research. He claims that in a rush to adopt laptops as the tool-du-jour in higher education, research on the potentially distracting impact of laptops on learning has been sorely neglected.

2.3 Conclusion

Given the broader debate currently underway in educational institutions questioning the distraction, busyness, and sustainability

associated with technology use in the classroom, this affords researchers interested in similar issues on a broader scale an excellent opportunity to gain insight on the day-to-day practices of large numbers of users. Additionally, it is important for scholars to explore ways to incorporate existing research on time and mindfulness in addressing sustainability in the lives of digital natives. Their perceptions of technology have been shaped by the prominent role that devices and constant access to information play in their daily lives at school, work, and home. During this workshop, our team will share five different research opportunities in various phases of design and implementation that could provide considerable insight to help foster simple, sustainable living in a fast-paced, highly connected culture.

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