

Continuous Partial Attention: Reconsidering the Role of Online Learning in the Age of Interruption*

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Abstract:

“Continuous partial attention” is a term that was coined in the late 1990s, to describe the increasingly dispersed nature of attention in online environments. The purpose of this paper is to describe the concept, discuss its implications for online learning, and propose a new agenda for research in what has been called “the Age of Interruption.”

We live in a time that is often called “the Age of Information,” a time when we are surrounded by seemingly endless repositories of data. Writing in 1997, Jennifer Tanaka observed that, “A single weekday edition of *The New York Times* today contains more information than an average person in the 17th century would have encountered in a lifetime” (n.p.). Over a decade later, the information to which we are exposed on a daily basis has increased exponentially, and most of it now resides on the Internet.

But the Internet brings us more than information. With the advent of high-speed transmission, mobile devices, and Web 2.0, it also offers the possibility of constant connectivity, which means that the Internet is now not only a source of endless information but a perpetual source of distraction. For this reason, Thomas Friedman (2006) insists that we have moved from the Age of Information to the Age of Interruption. “All we do now,” he says, “is interrupt each other or ourselves with instant messages, e-mail, spam or cellphone rings” (n.p.).

In the Age of Interruption, there is an overabundance of information, but attention has become a correspondingly scarce resource—so scarce that, according to commentators such as Michael Goldhaber (1997) and Richard Lanham (2006), what we see emerging is an attention economy:

By definition, economics is the study of how a society uses its scarce resources. And information is not scarce—especially on the Net, where it is not only abundant, but overflowing. We are drowning in information, yet constantly increasing our generation of it. So a key question arises: Is there something else that flows through cyberspace, something that is scarce and desirable? There is. No one would put anything on the Internet without the hope of obtaining some. It's called attention. And the economy of attention—not information—is the natural economy of cyberspace. (Goldhaber, 1997, n.p.)

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My theme in this paper is the issue of attention, and specifically an emergent form of attention, or inattention, that has serious implications for teaching and learning, and particularly for teaching and learning that is situated on the computer. “Continuous partial attention,” as it is known, is a contemporary phenomenon that caught my attention not too long ago, when I was researching university students’ experience of onscreen reading (Rose, forthcoming). During my interviews with undergraduate and graduate students, I noticed that most of the participants in the study talked about the distractions that diffused their focus on the texts they were trying to comprehend. “The computer is right there,” said one, explaining that she found it difficult to focus when MSN was on “and somebody goes dadoop, there’s a message.” Another admitted, “I’m wasting more time not reading than reading, you know, with e-mail and talking to other people. If it was a book, I would read more than if it was online because there are more distractions, easier ways to, oh, I’m just going to check this, and totally forget that you’re reading, and then an hour or two goes by and you’re like, I guess I should go back.” Intrigued, I decided to find out more about what was going on, and thus began my exploration into the nature and significance of continuous partial attention.

I believe that those of us who work in the field of educational technology must take this phenomenon very seriously, because we know that learning cannot take place unless the learner is intellectually engaged, present in more than just body. Furthermore, as Suzanne de Castell and Jennifer Jenson (2004) point out, attention is an essential condition for the functioning of technology-based learning environments, which—perhaps even more than the proverbial trees falling in the forest—exist only insofar as someone attends to them (p. 381). However, given the plethora of information that confronts us today, attention tends to be spread very, very thinly. Many people, young and not so young, find themselves spending more and more of their time in a state of continuous partial attention. It is the reality—some say the plague, some say the opportunity—of our time. For these reasons, we need to learn more about continuous partial attention and we need to consider its implications for education in general and online learning in particular. My purpose in this paper is to initiate that important exploration and discussion.

What is continuous partial attention?

The term “continuous partial attention” was coined in the late 1990s by Linda Stone, a former Apple and Microsoft executive, to describe what she calls a “post multi-tasking” behavior (2006, n.p.). Stone’s definition offers a good starting point, because continuous partial attention is perhaps best understood by contrasting it with multitasking, a phenomenon with which most people are all too familiar.

Multitasking entails doing more than one thing at a time, and it is primarily motivated by a desire to increase productivity. If I can read a report while I eat my lunch, and call a client during the commute home, then I become a more efficient, productive person—at least, that is the theory. In fact, many critics and researchers (e.g., Crenshaw, 2008; Loukopoulos, Dismukes, & Barshi, 2009) suggest that the quality of work suffers when people repeatedly switch from one task to another.

In a recent Kaiser Family Foundation report, Ulla Foehr (2006) described the phenomenon of continuous partial attention as “‘media multitasking,’ or engaging in more than one media activity at a time” (p. 1). Media multitasking is, in fact, becoming the accepted term for the contemporary phenomenon of fractured online attention, but those who use that term, or who

regard continuous partial attention as “a subspecies of multitasking” (Rosen, 2008, p. 106), miss the point that the two are qualitatively different phenomena, for a couple of reasons.

First, although it may certainly entail offline activities such as using cell phones, watching television, and listening to music on an iPods, continuous partial attention is a form of awareness and thought that arose with and is contingent upon computers and, more particularly, the Internet. This is in part because the online computer is “a gateway” (Foehr, 2006, p. 15) to a host of distracting activities, from emailing, gaming, and instant messaging to social networking and Web surfing. As Foehr (2006) observes, “having such an eclectic mix of activities available on one platform has a very clear effect on media multitasking” (p. 15).

But the online computer provides more than just the opportunity for diffused attention: it also gives rise to a compulsion to connect. This suggests the second important difference between multitasking and continuous partial attention: while the former is motivated by a desire to accomplish more faster, the urge behind the latter is not productivity but something very different—*connectivity*. As Stone (2005) explains,

To pay continuous partial attention is to pay partial attention—continuously. It is motivated by a desire to be a LIVE node on the network. Another way of saying this is that we want to connect and be connected. We want to effectively scan for opportunity and optimize for the best opportunities, activities, and contacts, in any given moment. To be busy, to be connected, is to be alive, to be recognized, and to matter. (n.p.)

David Brooks (2001) represents the insatiable need for connectivity in rather more negative terms, describing it as an info junkie’s addiction “to the perpetual flux of the information networks” and craving for “the next data fix” (n.p.). Regardless of how we view it, however, there is no doubt that, unlike multitasking, continuous partial attention entails a compulsive diffusion of attention from a central task to diversionary information gathering or communications activities that would never be found on a “To Do” list.

Those readers who, at this moment, are using their Blackberries to browse the Web for “continuous partial attention,” or who are itching to check their cellphones for incoming messages, know very well what it is to live in this state of fragmented awareness. So do those who “tweet” on a regular basis—for if Blackberries and cellphones are the continuous partial attention gadgets par excellence, “always-on and always-on-you” (Turkle, 2008), and offering in one compact device a wealth of opportunities to send and receive information, then Twitter and Facebook are their online counterparts, the means by which, through constant “pings,” users assert their relevance as nodes on the network. Continuous partial attention is also no stranger to those who find themselves frequently checking their email when they are supposed to be writing a paper or preparing for a class—and I count myself among this growing contingent.

In fact, continuous partial attention is no stranger to most computer users today. Our minds and eyes, as we use the computer to write papers, prepare presentations, read documents, or participate in online courses, are always scanning the periphery for incoming e-mail, instant messages, and other communications and contacts. Like video game players, we are constantly on the alert, our eyes darting, our fingers twitching, anxious not to let one message, one fragment of information, one potential contact with a virtual friend slip by.

Recently, a student whom I’ll call “Jeff” submitted, as the preface to an assignment in which he was asked to explain the role of media in his life, an eloquent description of the experience of continuous partial attention. I quote from it below, with his permission:

Okay, first thing's first. I must open a blank Microsoft Word document. Hmm...well first I'll just open up an Internet Explorer window and check my email and Facebook. No new messages. I'll just check up on the Blue Jays' off-season activity too. . . . Well, I guess there are no new Google News items on the subject since I last checked two hours ago. While I'm at it though, I might as well open two more tabs and see how the Toronto Raptors and the Boston Bruins did in their games last night. . . . What are you doing Jeff? . . . I think you need to go to the library and sit down in a cubicle with a pen and some paper. That's a good idea. Your computer is turning every passing thought into a time-consuming online endeavor. You need to unplug yourself in order to make any serious progress.

As this account makes clear, continuous partial attention is a state of hyperawareness, motivated by the feeling that “I don't want to miss anything,” and “I am reluctant to stop and give my full attention to one thing,” that has us constantly surveying the infoscape—even, or perhaps especially, when we are supposed to be doing something else. Productivity as a goal gives way before the lure of connectivity.

Cognitive dexterity or deficit?

In *No Time*, Heather Menzies (2005) expresses the view that continuous partial attention is symptomatic of our “attention deficit culture”:

It feels as if there's less and less of me in the picture—the me that can see with an engaged and probing eye, that can sense the underlying pattern and interpret what matters in the midst of all the data. It's not that I've been pushed out of the picture. I'm still here—my finger on the keyboard, my eye on the screen—but my attention is so scattered that my perception is trivialized. I'm being trivialized, too, by all the abbreviated messages I'm processing through my systems. (p. 91)

Gary Small and Gigi Vorgan (2008) concur that the phenomenon is antithetical to deep thought:

When paying continuous partial attention, people may place their brain in a heightened state of stress. They no longer have time to reflect, contemplate, or make thoughtful decisions. Instead they exist in a sense of constant crisis—on alert for a new contact or a bit of exciting news or information at any moment. (p. 47)

Allied against Menzies, Small and Vorgan, and others who regard continuous partial attention as a dysfunctional state of distraction are a growing contingent of commentators who assert that it is actually a learned form of cognitive dexterity. For example, Foehr (2006) suggests that young people's ability to process multiple streams of information may be an inevitable evolutionary adaptation to the new reality:

In this media-heavy world, it is likely that brains that are more adept at media multitasking will be passed along and these changes will be naturally selected. After all, information is power, and if one can process more information all at once, perhaps one

can be more powerful. (p. 24)

Jenkins (2009) concurs that we should view media multitasking as a skill that is “strategically employed by the brain to intelligently manage constraints on short-term memory” (p. 61). And Prensky (2001), advocate of the “digital native,” argues that young people today “are used to the instantaneity of hypertext, downloaded music, phones in their pockets, a library on their laptops, beamed messages and instant messaging” (n.p.) and therefore function best amidst multiple information streams—making this, Prensky adds, an ideal opportunity for their “digital immigrant” teachers to explore new, more appropriate pedagogies.

However, such views are not supported by a long tradition of research which shows that “human cognition is ill-suited both for attending to multiple input streams and for simultaneously performing multiple tasks” (Ophir, Nass, & Wagner, 2009, p. 15583). Studies in the area of cognitive neuroscience consistently show that there is a “switch cost” in the “mental ‘gear changing’” from one task to another (Monsell, 2003, p. 135); research in human perception similarly reveals the existence of an “attentional blink” (Raymond, Shapiro, & Arnell, 1992) during which people presented with rapid sequences of visual stimuli are unable to process new items; and other psychological research supports the conclusion that “people have surprisingly severe limitations” on their ability to simultaneously carry out two relatively simple tasks (Pashler, 1994, p. 241).

Such conclusions are borne out in studies of media multitasking in the workplace. For example, several years ago, researchers at the University of London studied the phenomenon of “infomania,” a condition of reduced concentration and mental performance due to continual response to electronic communications, such as text messages, e-mails, and social network posts. The researchers found, first, that many British office workers suffer from infomania, such that they will often check and send messages not only at work but at home and during holidays and social engagements; and, second, that distracted infomaniacs actually experience an IQ loss over twice that experienced by those high on marijuana (Horsnell, 2005, n.p.).

Research on the implications of media multitasking for education is scant, but what there is also fails to support the notion that people can learn to be effective media multitaskers. For example, a recent study of university students identified as either chronically heavy or light media multitaskers compared their abilities to filter out environmental distractions. The researchers found that the heavy multitaskers are actually “more likely to respond to stimuli outside of their immediate task” and therefore also more likely to “sacrific[e] performance on the primary task to let in other sources of information” (Ophir, Nass, and Wagner, 2009, p. 15585). In another study, Hembrooke and Gay (2003) tested two groups of upper-level Communications students for recall immediately following a lecture, and found that those who used their laptops to browse the internet or communicate with others during the lecture significantly underperformed those who kept their laptops closed—even if the online activity was directly related to the lecture content. Finally, Levine, Waite, and Bowman (2007) found a significant relationship between the amount of time college students spend instant messaging and their distractibility for traditional modes of learning, particularly academic reading. Apart from the fact that students may be distracted by instant messaging while carrying out academic tasks, they posit that repeated use of instant messaging may help to create “a cognitive style of short and shifting attention” (p. 565).

While such studies shed some light upon the educational implications of continuous partial attention, it is important to note that it is rarely referred to it as such. Rather, most

commentators and researchers still mistakenly view the phenomenon as a form of multitasking, and it is likely to become the subject of a concentrated body of research only when it is acknowledged as a unique, emergent form of (in)attention.

Continuous partial attention and online learning

Although we are only beginning to explore the implications for education of this emergent cognitive style of short and constantly shifting attention, the consequences are bound to be significant. After all, education as we know it is based upon the premise that learners will be able to perform one task at a time without distraction before moving on to another, which is why many learning difficulties are attributed to short attention spans or attention deficits. From Gagné on, most theories of learning and instruction begin from the premise that focused attention is a prerequisite of learning.

The phenomenon of continuous partial attention will have particularly serious implications for online learning, for learning activities that take place on the computer must compete with a growing number of websites, communication forums, games, and other online distractions. This suggests that educational technologists and instructional designers must begin to think differently about attention.

For decades, computer-based instructional programs have been deliberately designed to capture and direct learners' attention, through the use of images, animations, colors, and sounds. But in the current information environment, we need to ask if it is still enough to think about online learning in terms of gaining and guiding learners' attention, through the use of increasingly sophisticated multimedia. It strikes me that, confronted by learners whose attention is perpetually fractured, we must find a new way of conceptualizing online learning in the Age of Interruption. In particular, we need to ask how we can design effective online learning environments for people who are easily distracted and prone to frequently disrupt major tasks with information-seeking and communicative behaviours.

One increasingly popular response to this question is that we should turn to video games as a paradigm for online learning. For example, de Castell and Jenson (2004) suggest that, since video games are incredibly successful at holding the attention of the people, both young and not so young, who play them, we should study these games as learning environments. This suggestion is taken a step further by psychologists Shawn Green and Daphne Bavelier (2003), who assert that video games do more than capture attention—they can also enhance players' ability to function while keeping many streams of information and activity in the field of concentration. Green and Bavelier conclude,

By forcing players to simultaneously juggle a number of varied tasks (detect new enemies, track existing enemies and avoid getting hurt, among others), action-video-game playing pushes the limits of . . . visual attention. . . . Therefore, although video-game playing may seem to be rather mindless, it is capable of radically altering visual attentional processing [through] changes in known attentional bottlenecks, . . . speeded perceptual processes and/or better management of several tasks at the central executive level. (p. 536)

Exploring action video games as a paradigm for online learning is an area of research that generates a great deal of interest and excitement these days. But as I move toward the

conclusion of this paper, I want to offer both another way of thinking about the design issues that arise in a culture in which continuous partial attention is becoming the dominant mode of attention, and, emerging from this reconception, another agenda for research.

Rather than exploring ways to design online learning environments that exploit and even enhance the cognitive style of continuous partial attention, I believe that we should be giving very serious thought to finding ways to use the technology to minimize distraction and support people in developing their own strategies for finding focus. In a world of fleeting, fragmented attention, the traditional goal of capturing and guiding learner attention would seem to be increasingly important—but in fact, the opposite is true, because the most that we can hope for, when it comes to engaging learners who are accustomed to paying continuous partial attention, is to create continually flashier, louder, glitzier programs that will snag attention temporarily—perhaps, if we are lucky, until something flashier comes along. So, as I see it, we have two choices: we can decide to invest our thought and time in finding ways to continually up the ante, in the process exacerbating the general attentional deficit; or, accepting a role that is far more essential in the Age of Interruption, we can choose to explore ways to help learners control and direct their own attention.

What I am essentially talking about here is balance. Constant connectivity has undeniable advantages, but as Stone (quoted in Maxwell, 2002) observes, the balance, in our communications culture, has tilted too far in that direction, resulting in a state of continual distraction. The paramount consideration now must be to counter that trend and, Stone says, “Pausing to reflect, focus, think a problem through; and then taking steady steps forward in an intentional direction is really the key” (n.p.).

Our challenge, then, is to design interfaces and interactions that will promote that kind of focus and reflection in a culture of chronic inattention. We need to find ways to use technology’s strengths and capabilities, first, to foster learners’ awareness of the extent to which their attention is dispersed; and second, to help them to deliberately monitor and regulate their attentional resources. We need, in other words, *metacognitive* and *reflective* designs: online instruction that does not seek to control cognitive processes, but, by representing those processes in comprehensible terms, allows learners to begin to assert some control over them. Rather than enlarging a communications culture in which uninterrupted moments for contemplation are increasingly hard to find, such designs would harness images, text, and sound in ways that support the values of mindfulness and care. The goal, as Jerome Bruner (1968) puts it, is “to equip the [learner] with deeper, more gripping, and subtler ways of knowing the world and himself” (p. 118).

Of course, this is an imagined ideal—in much the same way that Vannevar Bush’s “memex” offered an illusory solution to the “growing mountain” of information that confronted people even as long ago as 1945. The memex that Bush proposed sixty-five years ago was a knowledge storage and retrieval system that integrated images, audio, and text, allowing users to build and follow “associative trails” (Bush, 1945, n.p.) at the click of a button.

Even from this brief description, it is easy to see why the memex is now heralded as the forerunner of today’s World Wide Web. But while Bush hoped that his proposed device, if it ever moved from the realm of vision to reality, would help to focus attention, free minds for what he called “mature” or creative thought (the kind of thought for which, he insisted, there are no mechanical aids), and thus increase the store of human wisdom, things did not turn out quite as he hoped. Instead, the Internet has become a source of endless distraction that derails deep thought by stimulating in its users a profoundly heightened attention to the multitudinous

fragments of information it contains. It will require a vision as bold as Bush's to reconceptualize online learning in the Age of Interruption.

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