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Are Gen-Y's Brains "Modular" or "Unconscious"?

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Both now and in the past, two visions compete for the soul of office design. One vision involves cost savings, and embraces office design as a tool to minimize space and thus save money. Using math any school child would understand, this vision has launched a thousand spreadsheets demonstrating that indeed putting more people into less space is "cost effective." Because this "reduction of overhead" (ROO) point of view links easily to the "bottom line," it has always been and remains popular with business leaders—particularly those charged with cutting costs. From this orientation, office space functions indirectly as a "business tool" by reducing the subtrahend in the familiar "income-costs=profit" (admittedly simplified) equation.

In contrast to the ROO viewpoint, Burolandschaft ("landscaped office") as well as Bob Propst's subsequent "action office" concept (and many great ideas since then) represent the strategic vision for office design (SVO). Largely through the lens of the behavioral and social sciences (and intriguingly employing much of the language of the currently popular "green building" movement), proponents of this approach view office design as a strategic investment in people—the occupants of office environments. Seen in this way, office space functions as a "business tool" by making people more effective, thus increasing the minuend of the "income-costs=profit" equation just mentioned.

Because the ROO approach lauded any product that subdivided space (for obvious reasons), this perspective eventually corrupted Bob Propst's "action office" idea to reduce costs through increased density, and with the arrival of pre-wired panels, the cubicle, for better or for worse, was born. Acoustic panels arrived shortly thereafter, and they promised the best of both these visions—space reduction (ROO) AND employee effectiveness (SVO)—through increased "privacy." Unfortunately, privacy was defined as a product characteristic (NRC; STC) rather than as a dimension of occupant experience[1]. This led to the design of offices that indeed saved lots of money (compared to dry-walled offices), but fell short of their goals for occupant experience—because occupancy quality was rarely rigorously defined or measured.

This attempt to integrate two fundamentally competing visions for office design—to have our cake and eat it too—remains with us today. Additionally, this continuing ambivalent model helps explain the tremendous popularity of the cubicle—because the cubicle promises to unite the ROO and SVO visions for office design. If we design offices with cubicles, we can presumably save money AND improve employee effectiveness—or so the assumption goes. The cubicle never "caught on" in Europe—not because European office workers didn't need privacy—but due to the Quickborner team's proposal that organizational effectiveness could be improved by line-of-sight, two-way interaction between managers and their workers (hence, "landscaped offices"). This presumed association between "more open" office design and improved communication has largely kept the cubicle "at bay" throughout Europe.

One of the latest manifestations[2] of this design *non sequitur* (there exist office designs that allow us to reduce costs endlessly yet improve employee effectiveness *at the same time*) involves the assumption that younger generations of workers (whether one begins with Gen-X or Gen-Y) can process information in fundamentally different ways than their older counterparts. We thus do not need to provide privacy in office design, because these up-and-coming prodigies can ignore distractions within more open environments. We are therefore free to concentrate solely on the ROO vision for office design, because the SVO vision is now nestled safely beyond the confines of office design *per se*; it remains neatly ensconced in the advanced cognitive abilities of the young. (For a recent indictment of open plan work environments for all age groups, see Oommen, Knowles & Zhao, 2008).

Unfortunately, careful laboratory experiments have shown this to be largely a myth, in spite of abundant (and compelling) anecdotal evidence (Anderson, 1993; Glass, Schumacher, Lauber, Zurbriggen, Gmeindl, Kieras, & Meyer, 2000; Laird, Newell & Rosenbloom, 1987; Laughery, 1989; Meyer & Keiras, 1997a; 1997b). Basically, for all age groups of workers, doing two (or more) things at once hurts primary task performance compared to single-task conditions. Certainly task complexity, experience level, strategy differences (e. g., dynamic attention requirements across task subcomponents) and other factors can influence this so-called dual-task performance deficit, but it has been shown to be quite robust across situations and conditions—particularly for difficult (e. g., generative) tasks.

Although I'm not aware of any scientific research that decides the issue, I would be willing to accept almost by definition that younger workers differ BEHAVIORALLY from their older counterparts in regard to frequency of multi-tasking; they almost certainly keep track of many more gadgets than I do, and no doubt they monitor information from all of them—to some level of proficiency (cf. Tapscott, 2009). But this "continuous partial attention," to borrow Linda Stone's marvelous phrase, may have some negative side effects, including lower primary task performance, "techno-brain burnout," and reduced sensitivity to face-to-face social cues (Small & Vorgan, 2008).

Here we must explore some relevant theory. Many years ago, Paivio proposed the "dual coding hypothesis" to explain evidence that linguistic (verbal) cognitive processing

differed from imagery-based (nonverbal) processing in a number of ways, perhaps even involving different brain areas (see Paivio, 2007, for a recent update). Also long ago, Shiffrin & Schneider (1977) wrote some influential papers demonstrating that, at least to a certain extent, such functional distinctions between cognitive tasks depend on learning; they distinguished between "controlled" and "automatic" information processing, arguing that tasks requiring "controlled" processing demanded attention, while tasks involving "automatic" processing did not. (These categories reflect William James' classic distinction between "voluntary" and "involuntary" attention; to a certain extent, this dichotomy also maps onto control of "novel" or complex tasks and well-learned tasks, respectively.)

Why this detour into cognition and attention? Well, this early work highlights current interest in whether the brain consists of a collection of independent modules operating in parallel, or instead features a general-purpose "executive" ruling a hierarchy of operations. If the brain is modular, then presumably it can do many things at once, in parallel, without interference across tasks. However, if it is a general-purpose device, then it basically can only do one thing at a time. An additional controversy involves to what extent practice (experience) with certain activities can alter (change) brain function from the general-purpose executive model to a collection of modules, running in parallel, somewhat unconsciously (cf. Kearney, 2007).

Here's how this relates to Gen-Y's presumed enhanced cognitive abilities. Has their greater developmental exposure to a variety of technology (I would be willing to accept this difference without confirmation, but cf. Palfrey & Gasser, 2008) made their brains veritable cities of activities—all operating smoothly and efficiently without interference even between adjacent tasks?

The best answers available right now suggest that indeed, if we focus primarily on lower-level (unconscious, well-learned, well-rehearsed) kinds of mental operations, younger people may have learned to divide their attention across several different sources of information (cf. Payne, Peters, Birkmire, Bonto, Anastasi & Wenger, 1994; Schumacher, Seymour, Glass, Fencsik, Lauber, Kieras, & Meyer, 2001). But for complex, unpredictable, demanding tasks (such as often confront "knowledge workers" in an office), their neurocognitive machinery remains subservient to the "bottleneck" of doing only one thing at a time—if high quality (error-free) performance is necessary (cf. Hans Korteling, 1994; Pashler, 1994). Furthermore, distractions interfere with their performance on such complicated, challenging tasks just as they do for older employees. They cannot "learn" to ignore conversations around them any better than their older counterparts. Thus, Gen-Y knowledge workers, at least while working independently, need approximately the same (physical design) conditions as older employees to excel at their work. They also can't be trusted to talk on a cell phone (or "text-message") while operating a vehicle. The recent (late 2008) Metro-Link accident in California underscores this peril.

So, this latest attempt to reconcile the ROO with the SVO vision for office design based on the presumed cognitive proficiencies of the young has also fallen short of adequacy.

I'll leave the question of how best to balance these conflicting visions for future offices to younger, more experienced minds . . . (however, I like to believe mobile/distributed work will figure prominently in the ideal solution; there—I managed to squeeze NewWOW in somehow!! But what about "professional isolation?" cf. Cooper & Kurland, 2002; Golden, Veiga & Dino, 2008. Both these studies found evidence that "employee development" can mediate the influence of teleworking on professional isolation, although the second article also found evidence of a "professional isolation"-lower job performance link.).

[1]Speech privacy can be defined as the inverse of speech intelligibility. Up to 80% redundant, speech (spoken language) is well-learned and processed to the level of semantics (meaning) automatically; thus, neither younger nor older employees can "learn" to ignore speech around them. The physical conditions that provide speech privacy to any arbitrary level within open offices are well-known (Orfield & Brand, 2004), and include absorptive ceilings, sound masking, absorptive floors; absorptive, low-transmitting walls or panels; and low occupant densities. It is meaningless to determine which of these factors contributes "the most" to privacy, because if they're not jointly present, speech privacy is not achieved, due to redundancy levels in the stimulus.

[2]Others include access to daylight, adequacy of "change management" to help people adjust (to more open office environments), and increased communication (i. e., support for collaboration). Typical attempts to integrate ROO and SVO visions for office design argue that the necessity of daylight and/or support for communication require(s) more open office environments (and therefore less privacy). However, if knowledge worker productivity is the goal, there is no substitute for providing speech privacy through the physical design of the office. Nonetheless, Haworth's Ideation Group has collected international evidence that suggests knowledge work is shifting from primarily individual activities to more group-based tasks. Assuming continued confirmation of this trend, the central focus for office design (to support knowledge work) may need to accommodate support for collaboration at some expense to the effectiveness of individual work—but in most cases, design decisions (related to these issues) rely more on intuition and anecdote than scientific evidence (see Brand, 2008, for a review of recent literature).

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