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Digital Media Technology and Your Spiritual Life:

An Uneasy Alliance

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Abstract:

Digital media technology has become a part of our everyday lives, filling a substantial portion of the constructive minutes and hours of our days. This technology was created by engineers, and is being further perfected by engineers with each successive generation. As engineers, should we not be at the forefront of learning how this technology is changing our culture and be leaders in teaching responsible use?

Science has documented that technology use is changing how our brain functions. Its use creates new neural pathways and causes cognitive overload in the area of our brain that controls decision-making, impulse control, attention, focus and short-term memory – reducing those functions. Our digital media technology use encourages bad habits that affect our focus, productivity, busyness, reading skills and our personal interactions.

These changes in our brain processing also affect our spiritual life. Their distracting nature affects spiritual meditation, prayer and contemplation. The changes in our reading habits affect our study of Scripture, and storing God's word in our hearts. Changes in how we interact with each other affect worship and fellowship, as well as how we relate to God.

Most people have wandered into using digital media technology without a conscious realization of how it is changing their lives and the function of their brain. As engineers, creators of technology, let's lead the charge in educating ourselves to build protective walls around our spiritual lives, and educating others to do the same.

Computers, streaming TV's, tablets, readers, game consoles, smart phones, smart watches, . . . , give us an ever-present portal to emails, texts, calendar alerts, and the abundance of the World Wide Web, with its social media sites, news, blogs, information, music, and games. As engineers have developed faster, smaller, smarter technology, it has changed the way we live. We now carry the wealth of knowledge of the Internet around with us. Contacting other people is only a few keystrokes away, making the world a much smaller place. Digital media technology use has become a way of life, with such endless opportunities we can't imagine life without it. We feel compelled to take advantage of its largeness – surfing more, texting more, tweeting more, watching more, pinning more, blogging more, emailing more, listening more, playing more, posting more, and responding immediately to technology's beck and call. It has become a ubiquitous presence in our lives, and there is no need of the latest how-many-hours-do-people-spend-online statistic to know social and informational media brokered by technology now invades every crack and crevice of life.

Because digital interaction is so ubiquitous and requisite to our daily life, it is difficult to step away and examine our relationship with it. We are too pervasively engaged with our digital technology to think self-reflectively about how it is affecting our lives, relationships and culture at large, much less how it is affecting our spiritual life. We don't think about what it is doing to our brains, our hearts and our souls. In the tourbillion of life, we are much more likely to be

practicing the presence of the smartphone than the presence of God. We are much more likely to be tuned into the blessings of convenience, comfort and control than the blessings of God. The Bible admonishes to “work out your own salvation with fear and trembling” (Phil. 2:12) and “be all the more diligent to make [your] calling and election sure” (2 Pet 1:10). It behooves us as Christians to diligently evaluate how our hyper-connected life may detract from the presence of God in our life and the aspects of life He has created us to need for fulfillment. As engineers, creators of technology, should we not be at the forefront of the charge to make sure our digital use doesn’t shut God out of large swathes of our lives? Should we not shoulder the responsibility of educating others how to use our technology responsibly?

We need to step back from the stimulation of our gadgets to observe and understand the brain on technology and destructive behaviors that technology encourages, then contrast these with the disciplines required for a committed Christian life. After evaluating these two facets, if a dichotomy is observed, the last step is finding your way out of technology addiction, back to a thriving spiritual life.

I. The Brain On Technology

As technology changes at a rapid pace, and our devices are out-dated as soon as they are purchased, our amazing God-created brains are able to adapt to this fast-changing world, and accommodate new ways of processing. A landmark study of digital media technology use and the brain was done by Gary Small, a UCLA professor of Psychiatry, in which he performed brain scans of people while they searched the Internet (Carr 120-121). He divided his subjects into two groups – net-savvy and net-naïve. The net-savvy group had been using the internet for years, and the net-naïves had minimal exposure. While net-savvy subjects searched the internet, the dorsolateral prefrontal cortex lit up luminously, indicating high activity in that region of the brain. Net-naïves showed hardly any activity in the dorsolateral prefrontal cortex, although they were also searching the internet during the brain scan. The net-naïve group subsequently spent one hour a day online and six days later were rescanned. Surprisingly, the net-naïve brain scans looked identical to those of the net-savvy – after only six days of a small amount of online activity. Dr. Small’s research reinforced that our brains are amazingly adaptable to accommodate new patterns of behavior and input, an aspect that brain scientists call malleability or plasticity, and he demonstrated that the area of the brain intensely used during engagement with technology is the pre-frontal cortex.

A. Plasticity of the Brain

We used to think the brain was hardwired and unchangeable. Recent discovery of neuroplasticity means that we can alter the neurochemistry of our brain to change beliefs, thoughts, processes and emotions, based on everyday actions and experiences. In the brain, neurons process and transmit information through electrical and chemical signals. Neural pathways are associated with particular actions or behaviors. Every time we think, feel or do something we strengthen these pathways. Habits are well travelled pathways. New thoughts and skills carve out new pathways, repetition and practice strengthens these pathways, forming new habits – like the net-naïve subjects learning to use the internet. Brain plasticity allows us to adapt to using new technology.

The unfortunate side of brain plasticity is that old, unused neural pathways weaken, decay and disappear. The brain is like a muscle, operating on the use it or lose it principle. What should

alarm us about brain plasticity is what we are losing in trade-off for adapting to using technology as we do today. Our ever-increasing engagement with technology is deepening neural pathways that make it difficult to maintain practices that are essential to our soul care.

B. Cognitive Overload in the Prefrontal Cortex

In his brain scans, Dr. Small discovered that the dorsolateral prefrontal cortex is used intensely while online (Carr 120-121). The dorsolateral prefrontal cortex is the seat of decision-making, short-term memory and problem-solving. The prefrontal cortex in general is the seat of impulse control, attention and focus, directing our thoughts and determining priorities. When this area of the brain is overloaded with technology use, its ability to direct other functions is diminished. The cognitive overload in the prefrontal cortex makes it harder to focus, control impulses, make decisions to use our time wisely, and impairs transmission of information from short to long-term memory. It also impairs the problem-solving abilities we engineers pride ourselves in. Dr. Rhodes (100) likens the prefrontal cortex to the air traffic control center of the brain, and states that using technology is like having an air traffic controller with no sleep, trying to handle ten times the traffic that he's been trained for. The persistent demands of digital life, where we're bombarded by stimuli and under continual pressure to attend to multiple things at once, overloads the air-traffic control center of our brain. We lose our ability to concentrate, our ability to choose, and our ability to make decisions to effectively manage our mental life.

When the prefrontal cortex is overloaded, decisions come from the amygdala, the involuntary and automatic part of the brain that relies on reflexes, impulses, habits and emotions – rather than what is right and rational (Vohs and Baumeister 49; Rhodes 77-79, 99). When ideas or actions are repeated often enough, they develop deep neural pathways, and our brain releases them to the instinctual amygdala. The automatic routine triggered by pings and beeps on our devices have deeply entrenched neural pathways, that we no longer think about. Overloading the prefrontal cortex by digital media suppresses the conscious, executive function of our brain – to make critical decisions, to be self-aware, reflective, to plan, learn new things, pay attention (Hart and Frejd 192-193). The persistent demands of digital life take away our ability to consciously control our brain and allows the reflexive amygdala to take over the executive control of our brain, meaning that the ingrained technology-response neural pathways take over. We are thus less capable to make decisions to be less distracted by our technology, to focus on what is important, to take time to reflect and set priorities, to pay attention to material we would like to store in long-term memory or to pay attention to the people in front of us. Thus, it is in our best interest to understand what digital media technology use does to our brains and our patterns of life so we can choose how we want to use it.

II. Habits Digital Media Technology Encourages

Rather than the generalities of neural pathway decay and cognitive overload, let's look at specific habits that technology encourages, keeping in mind the brain functions that interact with and drive these habits. I've classified these negative habits into five categories – the always “on” mentality that our portable technology encourages, the multitasking that our multiple screens and devices enable, our habit of filling time with the gaggle of things available on our devices, the changes in our reading habits when we're skimming through the endless possibilities on our screens, and the changes in our personal relationships that are brokered by on-line services.

A. Always “on”

The portability of our digital media technology has encouraged us to be always “on”, always available. Some employers now expect employees to be reachable 24/7 by email or text. The lines between personal life and professional life have been blurred to the point that many employees think it is perfectly acceptable to check social media at work. Much of our always “on” mentality is self-imposed. Most people admitted to reaching for their smart phone the second they wake up, and checking it last thing before bed. A study done at Nottingham Trent University (Andrews et al.) attempted to quantify our portable media use. They had participants estimate the number of times per day they accessed their smartphones, then installed software on the portable devices to track use. The average estimate of use was 20 to 30 times per day, but the tracking software registered an average of 85 checks per day - over double the participants’ estimates. This is alarming since most of the staggering statistics on digital media use are based on self-reporting, and thus are sorely underestimated. It is also alarming that we have little awareness of the frequency that we check our portable technology. 55% of the recorded smartphone interactions were less than 30 seconds, indicating a subconscious checking for new messages or reacting to notifications. The study called these “habitual goal-and-reward-based actions.”

“Habitual” is the terminology the study conclusions used. Why are we so attached to our technology? Why do we feel compelled to feed this dragon? Our brain is wired to seek the new. We are looking for the possibility of a great message, new information – even if its trivial, seeking a diversion from unpleasant tasks or avoiding being left behind or missing out. But this behavior is addicting. Every time we get that new information, the brain floods with dopamine, a pleasure drug, which makes us feel good and seek to repeat the activity (Levitin; Hart and Frejd 63). Neural pathways are entrenched with this compulsion to get a dopamine high from checking our devices, and it becomes an automatic response. As we develop tolerance with repeated overstimulation, the dosage has to be increased to achieve the original high, and we lose our ability to enjoy the simple pleasures in life.

When we’re always “on”, we are controlled by habit rather than conscious decision. We become sleep deprived, our tranquility and ability to enjoy simple things decreases and stress hormones increase. Neural pathways that support calm, linear thought decay.

B. MultiTasking

All our technological devices are supposed to save us time, and give instant access to people and information. However, we rarely find the space to really think about how we pass our time. Pressured to prioritize efficiency, we work with multiple windows open, and audible notifications turned on - so we can attend to e-mails, texts, twitter feeds and social media alerts the minute they come in. Streamed music hums through the computer speakers, and a Bluetooth phone connection hangs on our ear, while we carry on an instant message conversation. How much are we really getting done?

There are myriads of studies done on multitasking (Rosen 106-111, 207; Carr 129-134, 140-142; Rockwell and Singleton; Hembrook and Gay; Bergen et al.; Foerde et al.; Byyny; Hart and Frejd 74-85; UCLA), and we are not as good at it as we think we are. Research shows that multitasking increases errors and decreases the ability to retain information, thus lowering student

performance and decreasing productivity. It also damages our cognitive ability to concentrate and focus.

ERROR: A Michigan State study (Henion et al.) finds that interruptions lasting less than 3 seconds doubles the rate of errors in simple tasks. Just glancing away from what you're working on dumps the short-term memory. A Florida State University study (Stothart et al.) found that notifications alone were detrimental to attention demanding tasks, even when participants ignored the notification and continued working on the task. "Task-irrelevant thoughts, even in cases when the individual appears to be attending to the task at hand, disrupt performance on a wide range of tasks."

RETAIN INFO: Research on multitasking shows that performance always goes down with added tasks. Studies have found that student performance decreases by 1/3 while multi-tasking compared with sequential tasking, comparative to drunk drivers (Hart and Frejd 81). E-mail distraction degrades mental functioning equivalent to a 10 point drop in IQ – equivalent to losing a night of sleep or twice the mental impairment of marijuana users (Bregman, "Stop Multitasking"). With so many inputs coming in, our short-term memory is dumped constantly and there is no hope for the slower process of transferring information into long-term memory – i.e. "learning" the material.

PRODUCTIVITY: Workers distracted by email and phone calls usually take ½ hour to get back to their original task. 28% of a typical workers day is taken up by interruptions and recovery time (Jackson, "Your Attention, Please"). Other studies show if we're juggling 2 tasks, we lose 20% of our time. If juggling 3 tasks, we lose ½ of our time (Hart and Frejd 81-82).

INCREASED DISTRACTABILITY/UNABLE TO FOCUS: The more you multitask, the more distractible you become. Heavy multitasking destroys our will and ability to resist distractions. Researchers at Stanford (Ophir and Wagner) found that heavy multitaskers are not able to filter out what's relevant to the current goal and are slowed down by irrelevant information. Bombarded with several streams of electronic information they do not pay attention, control their memory or switch from one job to another as well as monotaskers. "Intensive multitaskers are suckers for irrelevancy, everything distracts them" (Carr 142).

Why do we multitask? Some people believe they are good at multi-tasking, but the aforementioned research refutes this. Multitaskers have built neural pathways that reinforce this behavior, and brain chemistry can contribute to the habit, also. Multi-tasking causes release of adrenaline, a stress hormone that triggers the body's fight-or-flight mechanism (Levitin). It provides a sudden burst of energy, increased heart rate and blood pressure, and increased metabolism – what we refer to as an adrenaline rush- a physical feeling of intense excitement and stimulation. However, adrenaline is a stress hormone, and excessive amounts can cause long-term health problems and lead to the loss of short-term memory, affecting our ability to learn.

The cost of multitasking is enormous. The consensus from medical, mental health, brain science and academic research (specialties of referenced authors) is multi-tasking causes attention difficulties, poor decision-making, lack of depth of material, information overload, internet addiction, poor sleep habits, overuse of caffeine, impaired thought processes, reduced cognitive ability, weakened memory, and increased stress. Although multitasking has become our new default mode, monotasking is vital for our brain, and by doing less we're likely to accomplish more.

C. Filling Time

Technology exacts an incongruous toll. Although it is supposed to save us time, it offers many ways to fill that saved time. In this age of perpetual motion, we wear our busyness as a badge of honor. The moment we're not doing something, we reach for our devices. The Global Web Index reports 39% of people use social media simply to fill time.

Why? To keep us from boredom? Or silence? Or our own thoughts? To keep us from not being productive? Are we mindlessly following deep neural pathways that automatically respond to pings and beeps? You see people interacting with smart phones and tablets while waiting in lines, sitting on busses, working out at gyms, eating in restaurants, listening in church. What do we have to show for all the time spent pointlessly in the digital world?

We fill our time with frivolous knowledge, not giving our brain the downtime it needs for processing - consolidating information, transferring it to long-term memory, reflection, introspection, creative thought. The brain needs down time to learn and for creative thought to occur (Hart and Frejd 67). Moments that are not filled with anything in particular are vital to our lives. This is when we, mostly subconsciously, make sense of our lives, organize our thoughts, talk to ourselves, listen to our creative brain, listen to God's whispers. The sad thing is we don't just lose these quiet moments, we actively throw them away by reaching for our media devices. Our digital habits are making it difficult to reflect, contemplate, and ponder profound truths, all of which are required for an authentic relationship with God and formation as spiritual beings.

D. Changing Reading Habits

The internet has made books accessible in unprecedented ways, but most people are reading less than before the availability of digital books. The internet is changing how we are reading and how our brain processes what we read.

SKIMMING: Digital media is used to manage and store our information, rather than retaining it in our brain's long-term memory. (We used to remember phone numbers, now we just look them up on our portable devices.) Thus reading online has become a habit of skimming- hurriedly and distractedly looking for the particular piece of information we are after, rather than trying to comprehend the topic and understand the context of the content. This is the thrust of Mark Bauerlein's book, *The Dumbest Generation: How the Digital Age Stupefies Young Americans and Jeopardizes Our Future (Or, Don't Trust Anyone Under 30)*. We have knowledge at our fingertips, but wisdom evades us.

COGNITIVE OVERLOAD: Not only does online reading encourage cursory reading - a process of elimination rather than deep engagement, it also has the tendency for the cognitive overload we discussed earlier. On-line reading is a concentration-fragmenting interruption system with its tabs, multiple windows and hyperlinks. The torrent of information causes high brain activity (Fig. 1) which detracts from comprehension and restricts transfer to long-term memory. Reading print, on the other hand, under-stimulates the senses, allowing for a calm mind (Fig. 1) and deep thinking. The information comes at you slow enough for your brain to transfer information into long-term memory. Eye movements are different for reading print vs. digital. When reading print, eye movement is left to right, with a careful perusal of words. On a digital page, eyes move in an "F" pattern. Initially they move across the top of the digital page, then move down the page, occasionally following a line partially across. The eyes are scanning quickly to sort & store

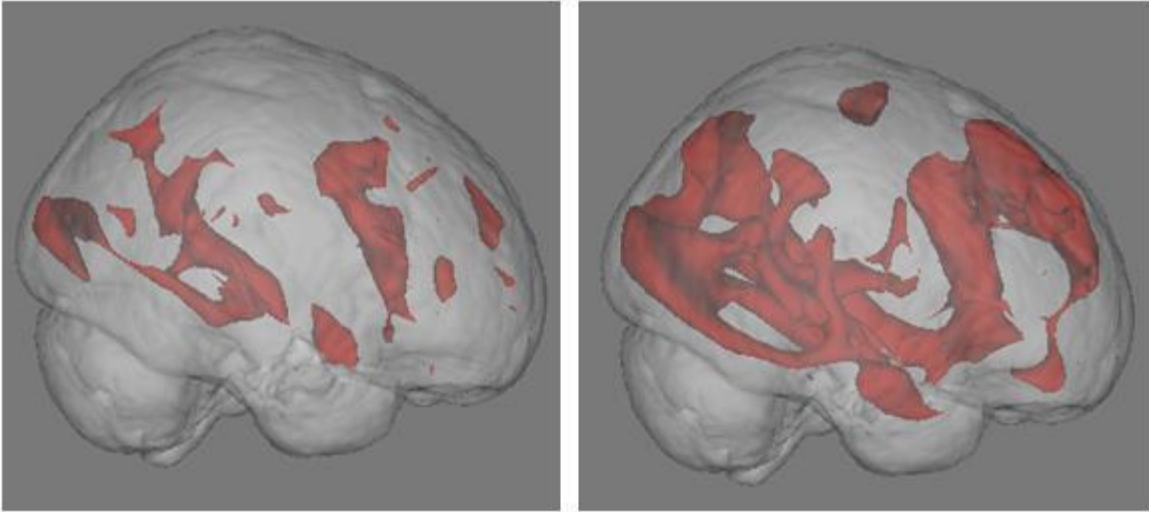


Figure 1: The Functional MRI brain scan image on the left displays brain activity while reading a book; the image on the right displays activity while engaging in an Internet search. (UCLA Health Sciences Media Relations)

bits of information rather than a more complex process of comprehension (Rhodes 22). Inevitably, through digitization we are losing our ability to learn and retain information, to reflect and think deeply. This is the argument of Carr's book *The Shallows: What the Internet is Doing to Our Brains*.

The more we train our neural pathways for this type of cursory reading, the more we lose the neural pathways and ability for deep, slow-reading engagement, where we're trying to understand and engage with the content. If we settle for superficial learning and shallow thinking, how will we ever mine truths from the Bible? How will we hide God's word in our hearts? It is easy to blindly settle for "the shallows" where we master the art of managing information but fail to experience the joy of discovering truth.

E. Changing Relationships

Relationships have increasingly become mediated through digital technology. Our internet access and social media apps have made it easy to connect with more old friends and family, and make acquaintances we never would have made otherwise. Online relationships are efficient, convenient and we can multi-task our way through them. We respond to messages when it is convenient for us and we don't have to give our undivided attention to anyone. Unfortunately, this kind of interaction develops shallow relationships. Sherry Turkle at MIT has done foundational research on how our relationships have been effected by our digital technology. Our media-mediated conversations are devoid of emotions, we tend to treat people as units, and we carefully compose and edit who we want to be online.

DEVOID OF EMOTIONS: 60 to 90% of our emotions are communicated in non-verbal ways – expressions on our face, eye contact, physical touch, inflections in our voice, body language, Written text is devoid of these emotional cues. We use emoticons and caps to try to capture some emotion, but digital engagement is an emotionally sterile structure which doesn't feed our souls. Communications are superficial and brief. We tend to be careless with our words since we don't

see the hurt at the receiving end. Our online friends are not the people that attend our family graduations or funerals. It is in-person relationships that share these emotional high and low points in our lives. As our neural circuits adapt to on-line relationships, our people skills diminish and we lose emotional aptitudes like empathy (Lin).

TREAT INDIVIDUALS AS UNITS OR INVISIBLE OR PAUSIBLE: It used to be that we would write a letter to a friend, sharing privileged information, personal reflections and feelings that gave depth to the relationship. We no longer have hierarchies of friends, groups of people that we share more intimate parts of ourselves with. We tweet or post the same information to close friends and barely mere acquaintances. It is hurtful to hear of engagements, weddings, or promotions of good friends and relatives over social media – along with the rest of the world. It robs relationships of the closeness and specialness when you are just lumped in and addressed as a unit. Probably even worse is when we use our technology to treat people as invisible. When people answer their phones in public restrooms and carry on private conversations in hearing of others, they are treating the people around them as invisible, non-existent. We also tend to treat people in our presence as pausable, elevating the presence and attention of absent people above those physically present. Digital interruptions supersede real time conversations.

RECREATE OURSELVES ONLINE: Our online persona is a created image, not our genuine self. When we use our technology to communicate, we are careful how we craft ourselves and our responses. Responses to people are premeditated, thought out, edited and revised to make us look as witty or intelligent as possible. We don't share gut responses like we are forced to in real person-to-person conversations, where our real selves are revealed. It is also easier to control what people know about you and your short-comings when conversations stay remote. On social media we carefully create our online persona as a performer on a stage. We try to impress and rouse applause (likes, shares, favorites, retweets) and live the fantasy of who we want to be. We don't form deep, heart-felt connections with people when we are performing.

Why do we resort to these kinds of interactions? Because real, in-person relationships are messy, untidy and inconvenient. Friends have unscheduled and unpleasant needs which don't fit neatly into our tidy, efficient lives. They have turbulent emotions and need us to listen and spend time. Superficial snippets of information are much easier to deal with than the messy complexities of relating in real time. Online we can be efficient with our time and don't have to give anyone our undivided attention. It is much easier to post an upbeat encouragement via digital media, then sit quietly with a hurting friend. These cursory, superficial, convenient online connections leave us feeling lonely, though, as these are not the type of relationships that God has designed us for. We are designed to be with people in person, to hear their voice, see their face and know their heart.

III. ELEMENTS OF AN EFFECTIVE SPIRITUAL LIFE

The rise of apps, social media, and ubiquitous digital technology is changing the way many of the world's two billion Christians practice their Christianity and worship. Our unchallenged social-media habits pose one of the most pressing discipleship challenges in the church today (Reinke). Too much digital engagement keeps us from showing up for life, from being mindful of God and living in the present moment. Digital distractions make us forget that we live in the presence of God, leading to a loss in worldview. Loss of a worldview means it's harder to see how things are connected to wholes. We experience the world as fragments, rather than from a central worldview that orients our lives to everything else. We need to ponder how the things we do and the way we live actually matters in the grand scheme of things.

So, what does an authentic, vibrant spiritual life look like? - One that is operating from a God-centered worldview? Richard Foster (“Celebration of Discipline”) set forth the following set of spiritual disciplines in 1978 and they have withstood the test of time as his book is still in print. His skeleton of spiritual disciplines was very influential in my life, as I established my worldview and pattern of life for spiritual growth.

Inward Disciplines

- Meditation
- Prayer
- Fasting
- Study

Outward Disciplines

- Simplicity
- Solitude
- Submission
- Service

Corporate Disciplines

- Confession
- Worship
- Guidance
- Celebration

While not wanting to establish these as an exclusive or comprehensive list of disciplines for real spiritual growth, it gives us a starting point to look at our technology use. This list, and probably your list of essential spiritual practices includes disciplines that need uninterrupted time, stillness and focus, comprehension reading skills and relationship skills.

A. Uninterrupted Time, Stillness, Focus

The disciplines of meditation, prayer, fasting, study, solitude and submission are the antithesis of the habits that technology encourages. They require uninterrupted time – instead of our always “on” mentality where we’re always ready and wanting to be disrupted, stillness – instead of always filling our time with frivolous newness so readily available at our fingertips, and focus – the complete opposite of our multitasking culture. Focused intentionality, focusing on God’s word, His laws, statutes, precepts enables us to create “the emotional and spiritual space that allows God to construct an inner sanctuary in the heart” (Foster, “Sanctuary” 26) We need to learn to stop, linger, focus, and reflect in order to “know” God - not merely to know things about Him, such as His character, but also to experience His presence and power, and to be transformed by Him. We also need to stop and listen to hear His whispers amongst the whirlwinds of busyness, the earthquakes of urgent demands and the fires of emergent emergencies (1 Kings 19:11-13). We must practice the habit of resonance - pondering how the things we do and the way we live actually matters in the grand scheme of things. We miss this when cyber-time is our perpetual reality. We must regain the ability to concentrate, to pay attention as we come into God’s presence, and experience the awe of who’s presence we are in – the God and creator of the universe, the creator of our lives and author of our salvation. He should not be treated as another beep or ping on our smartphone, needing a quick multitasked response. This is our God and our salvation – the most important aspect of our lives. And if its important, its worth being uni-tasked. Which means there must be priorities that trump our iPhone push notifications. Maggie Jackson ends her secular book “Distracted: The Erosion of Attention” (266) with a warning of the dire consequences – “We can create a culture of attention, recover the ability to pause, focus, connect, judge and enter deeply into a relationship or an idea, or we can slip into the numb days of easy diffusion and detachment ... The choice is ours.” Should we not aim to uni-task our study of God and our prayer life? Theologian and philosopher David Wells (17-18) suggests that the “affliction of distraction” is the greatest challenge of our age. “How, then, can we receive from Scripture the truth God has for us if we cannot focus long enough, linger long enough, to receive that truth?”

Scripture calls us to a life of single-minded self-reflection that often gets thwarted by the hum of our ever-present digital technology. The Bible calls us to times of stillness and quietness (Eccl. 4:6, Isa. 30:15, Isa. 32:17, 2 Thess. 3:12, Ps. 46:10), and equates trust in God with a calm and quiet soul (Ps. 131:2). Christ Himself retreated from the bustling life to the distractionless wilderness for prayer and spiritual rejuvenation. The Bible calls us to focus, to lay aside distractions and run with endurance the race set before us (Heb. 12:1). And it calls us to meditate on the Law of the Lord day and night (Ps. 1:1-3), not just in 5 minute blocks we've carved out of our busy lives for devotions. Scripture also calls us to prayer, and the biggest problem with prayer is the absence of me, with my mind wandering, not the absence of God.

The neural pathways that our technology use have reinforced make it hard to spend any significant time in prayer, reflection on scripture or listening to a deep sermon. Our neural pathways for healthy balance are atrophied due to being increasingly wired for activity, motion and continual distraction. We need discipline, determination and follow-through to change ingrained life patterns. Our ability to interact with God is dependent on dealing with distractions from within as well as without. Research out of Harvard (Killingsworth and Gilbert) shows our minds wander 47% of the time, and when our minds wander, we are unhappy, feel anxious and the brain is overloaded. Interestingly, they point out that "many philosophical and religious traditions teach that happiness is to be found by living in the moment and practitioners are trained to resist mind wandering and 'to be here now.'" They conclude that a wandering mind comes at an emotional cost and religious traditions have had it right all along. Are we living up to our religious traditions, though? We must regain the ability to concentrate, to pay attention as we come into God's presence. Single-mindedness is attainable through patience and practice.

The pay-off for reviving those atrophied neural pathways for uni-tasking, stillness and focus are immense. A host of brain-imaging studies during meditation (Rhodes 101) show that deep thinking and quiet reflection make us more socially aware, reduce negative feelings, counter effects of depression, help achieve goals, increase creativity and spatial processing, give fresh perspectives on problems we face, and reduces stress. As we put aside noisy chaos within and without to connect with God, and intentionally allow God's spirit to direct thoughts, not only is our relationship with God nurtured, but neural pathways from the prefrontal cortices to the amygdala are strengthened also, enhancing our emotional state.

Resolve yourself to embark on a journey in solitude, submission, meditation, prayer, fasting and study. Strive to enter God's rest (Heb. 4:10-11), knowing that resting means wasting time on God Himself.

B. Comprehension Reading Skills

The spiritual discipline of study requires the old comprehension reading skills that allowed calm linear thought to form an accurate, composite picture of God, so we can compile a full picture of what God requires of us and how He wants us to interact with our world. The spiritual disciplines of worship and celebration require these focused reading skills also – in order to understand Who our worship is directed towards and what we are celebrating.

The body of Christ shares a collective story, across continents, through centuries, passed down primarily through printed word. Although 9 out of 10 Americans own a Bible, only 80% consider it sacred literature. 58% believe it is the inspired word of God, but only 13% of Americans read it daily. Of those that do read the Bible, only half do so to connect with God, the

rest read it for personal comfort or practical trips – for self-interest. (Barna, “State of the Bible”). The most popular Bible verses bookmarked or highlighted digitally and shared on social media – deal with personal struggles or dealing with anxiety, rather than promoting the glory of God (Stokel-Walker). Most of our scripture interaction is not centered on trying to comprehend the breadth, width, height and depth of our spiritual story. Scripture tells us to “*study* to show thyself approved unto God” (2 Tim. 2:15). When we read just for knowledge, direction, or inspiration, we are displaying “a form of godliness, but denying the power thereof. From such turn away” (2 Tim. 3:5).

Unfortunately, our digital life can encourage “a form of godliness” without the power of studying “to show thyself approved unto God.” We can be fooled into thinking we are absorbing the word of God. 81% of Christian millennials post scripture on social media (Barna, “Millennials”). But for many, the extent of theological reflection springs from scriptural slogans or Biblical tips from social media apps, YouTube videos or websites. We can nibble around the edges of the many on-line Christian resources, overtaken by the vastness of what is available. Dr. Rhodes in her book “The Wired Soul” (61) speaks of the feeling of being dropped in the middle of a grand amusement park when she went into her church’s on-line media library. Everything seemed so enticing she ended up hopscotching around, reading a snippet here, watching a minute or two there, trying to settle on one amazing lesson over another. Spending so much time grazing around the edges of the choices and feeling spiritually sated while never communing with God in meaningful ways through His word. As our mobile phone Bible is now replacing the paper version of the Bible, Reverend Pete Phillips, from Durham University (Stokel-Walker) warns of interacting with the Bible in bite-sized nuggets. “If you go to the Bible as a paper book it’s quite large and complicated and you’ve got to thumb through it. But you know that Revelations is the last book and Genesis is the first and Psalms is in between. With a digital version you don’t get any of that, you don’t get the boundaries. You don’t flick through: you just go to where you’ve asked it to go to, and you’ve no sense of what came before or after. ... When you’re on a screen, you tend to miss out [on] all the feeling stuff and go straight for the information. It’s a flat kind of reading, which the Bible wasn’t written for. You end up reading the text as though it was Wikipedia, rather than it being a sacred text in itself.” We need to carefully consider what contribution our spiritual activity online is making to our relationship with God.

For spiritual growth, it is best to stick to the simplicity of sitting quietly before our Maker with only our Bible open, reading, listening and hearing God’s voice. We need to read for comprehension – pausing and pondering the words. We need to read reflectively – reading slowly to be more aware, listening for God to speak to us through His word. We need to participate in our reading – allowing what we read to change us, to change our lives. We need to read for retention – so God’s word can abide and dwell in us (John 15:7-8, Col. 3:16), and be bound on our hearts (Ps. 1:1-6, Ps. 37:21, Ps. 40:8, Ps. 119:11,16, Pr. 6:21-22, Matt. 4:4), which is not the same as carrying it with us on our smartphone. To accomplish these in our reading of Scripture, we need to be thoughtful, disciplined, and deliberate, which requires focus, consistent practice, reflection and depth. We need to realize that God Himself is speaking the words to us.

Remember that our brains are malleable and will respond to build stronger neural pathways while we establish better spiritual reading habits. “A person doing sacred reading has to resolve to waste time, a terribly countercultural, counterproductive move in this media and web-saturated culture.” (Lichtmann 22). It is essential for our spiritual lives, as God admonishes us to be

diligent about keeping our souls (Deut. 4:9, Prov. 4:23) and tells us that keeping, meditating, and observing scripture brings life to our souls (Josh. 1:8).

C. Relationship Skills

Richard Foster (“Celebration”) set forth a whole group of spiritual disciplines that are corporate in nature. Spiritual formation can never be relegated to a solo endeavor. Community and relationships are the very currency of spiritual growth. The Father, Son and Holy Spirit created man in their *own* image, establishing a pattern of communal life. God created companionship because it is “not good for man to be alone” (Gen. 2:18), and we see that with babies that fail to thrive when denied human interaction. Then, the Word became flesh and dwelt among us (John 1:14) – the ultimate in sacrificial relationship. Throughout the Bible, human relationships are modelled as the way God wants us to live. The Israelites lived together in tribes. Their punishment was dispersal, but God’s plan was to gather them together (Micah 2:12). Christ gathered close friends around Him – the 12 disciples and Mary, Martha and Lazarus. Fellowship was important to the early church (Acts 2:42), and they were admonished to love one another with brotherly affection (Rom. 12:10). Paul, many times in his epistles, expressed his desire to see others face-to-face (1 Thess. 2:17; 3:10). John, exiled on the isle of Patmos, hoped to see his family of faith in person (2 John 1:12). The culmination of our spiritual sojourn is all about relationship, when Christ will gather His elect (Matt. 24:31). Our spiritual journey is about relationship with God and relationship with man – both individually and communally.

RELATIONSHIP WITH GOD: Our whole spiritual life is about relationship with God, and submission to Him. Deeply meaningful times alone with God, loving conversations with Him and study of His word, result in greater consecration and are an indispensable component of formation in His Image.

RELATIONSHIP WITH MAN - INDIVIDUALLY: We are commanded to encourage one another (Heb. 10:25) and carry one another’s burdens (Gal. 6:2) - to interact with each other on an emotional level. We are to rejoice with those who rejoice and weep with those that weep (Rom. 12:15), to be tenderhearted towards each other (Eph. 4:32) and to love our fellow man (Lk. 10:25). When 60 to 90% of feelings are expressed in non-verbal ways, God’s mandates indicate face to face, person to person interactions. In our digital worlds, we think we’ve shown compassion when we comment with an inspirational quote or verse or post a “like.” We think we’re interacting with others when we post pictures on social media but are too busy to visit our neighbor, when we place our cell phone on the table while dining with a friend. Instead, we are having a private expression of faith between us and our screen and destroying the intimacy of our personal interactions. Is God’s image in us is slowly being extinguished as we rely more and more on technology and less on the gentle whisper of His voice wooing us to reach out and really touch each other? What might it mean to go deeper in relationships to be more present personally and share more vulnerably in order to give and receive encouragement in our journey? Therefore, encourage one another and build each other up (1 Thess. 5:11). This admonition ranges from the simple – a smile or hug, to the sacrificial - sabotaging schedules or billfolds to meet other’s needs.

RELATIONSHIP WITH MAN - COMMUNALLY: We are also called to be in community with each other – “not forsaking the assembling of ourselves together” (Heb. 10:25). However, a separate strand of Christian practice is booming – the belief that it is no longer necessary to set foot in church. The Pew Research Center (*Religious Landscape Study*) reports that 1/5 of

Catholics and ¼ of protestants seldom or never attend organized services. Online spiritual content is substituted that seems relational but actually takes place in isolation. Church services via the computer or TV cater to a personalized religious experience – you can pick and choose to fashion an individualized faith that perfectly caters to all your preferences. It is about us, not community. On-line we choose friends, news sources, and create playlists that fit our worldview and our preferences. If someone disagrees with us, we hide, block, unfollow, unfriend, delete. We create a digital world that caters to our views and preferences. DiSalvo (55) warns that “the danger is that technology could limit the perspective of its users and breed insular thinking, turning us into a society of myopic cliques.” The same danger applies to on-line church. The offline Church is diverse with different preferences in music and preaching, different ethnicities, cultures, spiritual languages, ages, spiritual maturities and burdens for service and outreach. Not everyone gets along. “Learning to do community with such different people, in the flesh, shapes me into a much better person than one who does community solely in front of a screen” (Pierce). When people come and worship in spirit and in truth there is also the presence and dynamic of the Holy Spirit that can’t be repeated through a group skype call. We are called to be with each other and to worship together. But beware that you don’t show up for church and fiddle with your phone – looking for something more promising, more entertaining than the joy of God offered in embodied fellowship.

While web-saturated existences can reduce relationships to instant messages and images on social media, living contemplatively calls for ever deepening connections both with God and others. We need to preserve and repair our neural pathways that support in-person, deep, engaged relationships so that we can relate to God. Digital engagement can augment interpersonal connections but its sterile structure is dangerous to the well-being of our soul. Human relations are difficult and messy, and the internet makes it easy to hide from this. We need to develop the discipline of presence, freed from the tedium of incessant interruption, to experience the power and beauty in relationship, to honor and attend to the people around us. We need to build the depth of relationship where we are comfortable confessing our “faults to one another” (James 5:16), receiving constructive criticism (Prov. 27:17) and seeking guidance and encouragement from fellow believers. This is the depth of relationship that God has created us for. We also need to open ourselves to the wonder of spiritual community, rather than participate solely in a world of our own preferences.

IV. The Way Back

Unfortunately, most of us have just wandered blindly into using digital media technology without honestly assessing how our engagement is affecting our lives, allowing each upgrade to invade further. We’ve allowed ourselves to be caught up in the swift-moving current of digital culture that waits for no one. We move mindlessly through our days, while life slips through our fingers, pulled along at technology’s relentless pace. We don’t stop to assess how the digital tsunami is affecting our quality of life, our relationships, our productivity, much less our spiritual lives

The Bible has outlined the emptiness of inanimate technology long ago in Ps. 115:4-8: “But their idols are silver and gold, made by human hands. They have mouths, but cannot speak, eyes, but cannot see. They have ears, but cannot hear, noses, but cannot smell. They have hands, but cannot feel, feet, but cannot walk, nor can they utter a sound with their throats. Those who make them will be like them, and so will all who trust in them.”

We become like what we behold. To worship an idol is to become like the idol; to worship Christ is to become like Christ (Ps. 115:4-8; Rom. 1:18-27; 12:1-2; Col. 3:10; 2 Cor. 3:18) What we spend our time beholding shapes our hearts and molds us into the people we are. Gazing at a screen, endlessly enmeshed with digital devices develops dependencies which gives access to our hearts. We lose our freedom to rely on the Holy Spirit to shape our choices and it is hard to hear God's voice or see His hand or grasp His heart for those all around us.

We must override these unhealthy patterns of digital dependency by establishing new, healthier habits of life. We are able to do this, with God's help, due to the malleability of our brain. We need to create healthy neural pathways and keep using them until they become habit. Summarized below are potential steps to rewire your brain to replace harmful patterns with better neural pathways - neural pathways for a vibrant spiritual life.

1. **Mindfulness** – Becoming aware of your thoughts and decisions is essential for helping the brain to create new pathways. You must be observant of your inner experiences and convicted you need change. Ask God for spiritual revelation regarding the amount of time you are beholding digital screens, the ways you are seeking to satisfy your soul in that space, and how you are falling short of the glory for which He created us for.
2. **Set new goals** - Establish rules to set boundaries on online hours, curb interaction with smart phones and establish a protected “Godspace” – free of interruptions. Set basic parameters for when, where and how you will use technology and spend quality time with God and others. Rules turn intentions into specific commitments, commitments into actions, actions into habits, habits into a way of life. Rules can become cold legalism, but rules acknowledge that to live the way we want to live, humans need something with more backbone than in-the-moment willpower can provide (Medefind).
3. **Make a conscious decision for new behavior** - Use filters, apps and accountability to limit your technology consumption. Recognize triggers that regress to old patterns. Own up to your finiteness and the fact that you have to say ‘no’ to some things.
4. **Seek pleasure from healthy pursuit of reward** – Realize that our technology use causes dopamine releases, pleasure hormones, which is part of the addicting behavior. In order for the brain create new neural pathways, we need to substitute healthier rewards and regain our ability to enjoy the simple things in life. Might I suggest that a walk in nature, without your technology, will do double duty. It will provide healthy pleasure and, according to research at the University of Michigan (Kaplan), will restore the focus that technology can steal from us.
5. **Practice, practice, practice** - New neural pathways need to be strengthened until they become the default mode. Peter Bregman (“Eighteen Minutes”) recommends stopping for 1 minute at top of every hour to evaluate if you're doing what most needs to be done right now, and being who you most want to be right now. Realize that you are going to fail because you are fighting well cultivated neural pathways and a pleasure reward that is well established. Cognitive neuroscientists say that recognizing when you get derailed and deciding to return to the new goal helps alter the brain circuitry (Rhodes 79). It is

imperative that you *persist* in fighting to secure time and focus to allow God's voice to break through your busyness and pierce your heart.

6. **New healthy habit formed** – Habits of operating from a God-saturated worldview while using technology, and exercising dominion over technology (Gen. 1:26-28)

Digital media technology has immensely expanded how we find information, how we do our work, what we're able to accomplish, and how we communicate. It has immense benefits – which is why we scramble to get each new update! But just like any new tool, responsible use means learning how to use it and knowing its limitations. Our culture has become so bedazzled and enmeshed by the expanse of its use that most haven't had time to reflect on its limitations. As Christians, the consequences of this passive approach are dire, as digital media technology can stealthily steal our time, our focus and our relationship with God. We must live a more cognizant, mindful life, carefully choosing how we're going to live our lives for God's glory. Paul tells us that a life well lived is a life lived carefully (Eph. 5:15-16, Col. 4:5). Be vigilant with your technology, using it as a tool to enhance lives, relationships, and spiritual life, rather than letting the tool control us. As admonished in Christ's parable of the sower (Mark 4:13-20), keep a protected patch of "good ground" to cultivate your relationship with God, uncluttered by the stones of distraction and the thorns of technology.

As engineers, we are both designers and users of modern technology. We should be on the forefront of knowing the limitations of our technology and its appropriate utilization in our lives. We should lead by example, reflecting a peaceful presence from meaningful communion with God in our harried world. Challenge those around you to not mindlessly follow the cultural response to digital media technology. We do have control over the balance of technology and the life God wants us to live.

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