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## The History of the iPad

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# The History of the iPad

## **Cover Page Footnote**

Thank you to Roger Williams University and Salve Regina University.

# The History of the iPad

Michael Scully  
Roger Williams University

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The purpose of this paper is to review the history of the iPad and its influence over contemporary computing. Although the iPad is relatively new, the tablet computer is having a long and lasting affect on how we communicate. With this essay, I attempt to review the technologies that emerged and converged to create the tablet computer. Of course, Apple and its iPad are at the center of this new computing movement.

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## Introduction

After a few years away, my wife and I returned to our home in New England to resume our careers. As part of the move, we began rebuilding the household, which meant decorating and assigning furniture to places around our suburban Dutch colonial. I also made the ill-fated decision to hang our 42-inch plasma television—which weighed 53-pounds—myself.

For the better portion of my life, I have owned a television. There were TVs in my childhood home, my college dorms, all my living spaces since college and, because I worked in media, there were televisions ever-present in my professional life too. In fact, these days, when I lecture to undergraduates about the technologies of each generation, I tell them that the newspaper belonged to my grandfather, the radio to my father, the television to me and that the Internet belongs to them.

So, when the moving van arrived I had a vested interest in getting the television out of the truck and into the living room. Apparently, I was not the only moving customer with a television addiction. It was clear, when the television arrived inside the living room that my attention had shifted away from managing the move to removing the television from its box and getting mounted on the wall.

“This always happens,” the lead mover said. “The woman is obsessed with the China and glassware and the man focuses on the television and the sofa.” Guilty as charged, I confessed to him and he helped me open the box and remove the television. As he and two other workers lifted the flat panel out of its foam-rubber packaging, one of them noticed a problem: “That mount doesn’t look strong enough to handle the weight of the television,” he said.

“No, no,” I argued, “it will be fine. And not wanting to argue, they placed the television on the wall brace and stood back. When they saw that I was pleased with its placement, they dispersed and we quickly returned to the moving truck to finish the move.

Now, the mover's observation about television addiction hung with me. According to the *Scientific American*, Americans spend an average of three-hours per day looking at television.

At this rate, someone who lives to 75 would spend nine years in front of the tube. To some commentators, this devotion means simply that people enjoy TV and make a conscious decision to watch it. But if that is the whole story, why do so many people experience misgivings about how much they view? In Gallup polls in 1992 and 1999, two out of five adult respondents and seven out of 10 teenagers said they spent too much time watching TV. Other surveys have consistently shown that roughly 10 percent of adults call themselves TV addicts. (Kubey and Csikszentmihalyi, 2002, pp. 74-80)

After the movers had left, I found my way back to the television and within a few minutes, I had plugged it into the cable box and a signal was splashing video images into the living room. I immediately declared that I had returned to a state of normalcy and then went about my daily business. In the next room over, I placed my computer on the dining room table and began reading student essays for work. I did this as the television continued to receive data over the cable network channeling the CNBC business news network into the room. I use the television to provide background noise to fill the room as I labor forward doing schoolwork.

Roughly three hours went by when I heard an odd mechanical creaking sound. The noise was alarming because it reminding of an automotive transmission sound just before something horribly went wrong. But, because I was caught up with my work duties, I ignored it believing the sound had come in through the living room window from outside. Ten minutes later, I heard a loud crash and I leapt from my editing seat and into the living room to discover the plasma television had crashed to the floor; the screen was shattered; and the electronics inside were crackling and popping. Clearly, the movers were correct: the brace was not strong enough. Of course, the television was destroyed. Upset and dejected, I left the broken set on the living room floor for three days. Then I finally lifted the unit up and carried it out to the curb on trash night. Fifteen minutes later, garbage pickers had come along and snagged the broken set from the curb; thus ending my relationship with that television and all television.

That accident happened on April 12, 2013 and as penance for my arrogance, I refused to go out and purchase another television.

It didn't take long, however, for the addiction to trigger withdrawal symptoms. I began getting anxious and irritable; I was impatient and lonely; I was also feeling a strange detachment from—well—the television cosmos. Kubey and Csikszentmihalyi (2002) address these troubles in their *Scientific American* article:

Habit-forming drugs work in similar ways. A tranquilizer that leaves the body rapidly is much more likely to cause dependence than one that leaves the body slowly, precisely because the user is more aware that the drug's effects are wearing off. Similarly, viewers' vague learned sense that they will feel less

relaxed if they stop viewing may be a significant factor in not turning the set off. Viewing begets more viewing.

When I lost the television, I began feeling pronounced withdrawal symptoms. In college, we called this feeling “Jonesing,” and like most addicts, I began searching for a replacement. It didn’t take me long to pick up my iPad.

Scientist Kenneth Blum (2011) called this process of trading one addiction for another as “Reward Deficiency Syndrome” and he attributed the cause to brain chemistry. He wrote that as humans build an addiction for something the amount of dopamine—or feel-good chemicals—in the brain raises and lowers as the user has contact with his/her addiction. In Blum’s study, he looked at how someone addicted to alcohol also has a predilection for other addictions including obesity.

Therefore, we hypothesize here that RDS is the root cause of substituting food addiction for other dependencies and potentially explains this recently described Phenomenon (addiction transfer) common after bariatric surgery.

In my case, watching television flushed my brain with dopamine and I continued to watch television because the practice kept my dopamine levels higher. Turning to the iPad, of course, has had many plusses and minuses.

## **My iPad**

I’ve owned three iPads since the product first came out four years ago. My first was the iPad 1, followed by the iPad 2 and now I own the latest, the iPad Air. The current model—at just 1 pound—is lighter than the previous two others; it also has a much better processing chip, better software and much more memory. I also placed it inside a red leather cover to protect it. The surface of the iPad is a heavy black glass called “gorilla glass,” and the border of my iPad is white. Now, this particular piece of computer hardware is part of the tablet computing family; these computers tend to be smaller, lighter and—primarily—battery operated. Given its size, weight, portability, usability and sleek design, I tend to take the device everywhere with me.

I use mine for a variety of operations including:

1. reading and sending email;
2. Internet searches;
3. Social Media;
4. paying bills;
5. shopping;
6. banking;
7. video-telephone conversations;
8. photography;
9. video;
10. playing video games;
11. watching legacy television;
12. viewing legacy movies;

13. music;
14. radio;
15. making travel reservations;
16. searching for restaurants;
17. mapping out directions to destinations;
18. reading books, magazines and legacy news;
19. logging calendar events;
20. word processing;
21. math calculations; and
22. taking and saving notes.

In my hands, the iPad has virtually replaced most of my traditional computing needs. In fact, I spend much more time with the iPad than I do with my laptop computer, which is a MacBook. I favor the iPad because it's portable and easier to use. Also, I've discovered that I use the MacBook Pro for production and the iPad for reading and research. Further, the iPad has become a fusion device that fuses together a series of legacy technologies performed by books, calculators, calendars, cameras, computers, e-readers, magazines, radios, telephones, television, VCRs and video cameras among other things. It may be the perfect device for media synergy; or it may be a mere stepping stone for whatever is coming next.

Now, when Congress was mapping out the commercial uses of the Internet back in the early 1990s, most of the congressional testimony was about something they called "convergence." To them, the idea was a fusion environment or space that allowed for many media to occupy and sear together a unified message or idea. At the time, no one had any idea how the primary media—text, television, radio, music, movies, photographs and video—would ultimately join together, but the projections of the future were hopeful. During arguments over the future telephony, the members of Congress argued for a place that might accommodate each medium but not favor one over the other. At the heart of this was the legislation—the Telecommunications Act of 1996—which was the legal document the federal government crafted to open up commercial development of the Internet; prior to the passage of the bill, the Internet was a quasi-defense initiative tied to the Defense and Energy departments. After the Cold War, there was a movement afoot to commercialize defense projects, and the Internet was part of that effort.

Now, it is my belief that the commercialization of the Internet catalyzed the Age of Communication globally and, as a part of that, there has been a pronounced effort to build a user experience that would act as a conduit for information, communication and productivity. It is my belief that the iPad—and the other computer tablets—may be the technological Pangaea for this movement. It took 20 years, but finally, there is a consumer electronic device that is personal, portable, affordable, aesthetically appealing and eminently usable. And while the tablet computer still hasn't quite matured to its full potential, there are glimpses of future technologies in this device. Ultimately, the final device will be a media diary, or digital container that contains the whole of our life experience: photos, messages, conversations, photos, video, web searches and so forth. Is the iPad doing that now? For the most part, the iPad is a personalized portable gateway

into the digital places that reflect our human selves. It has the potential to be the digital model of self, or the extension of self beyond the bio-matter: the digital mini-me.

But... before we get into all of that, let's pull back and look at its inception.

## The iPad

In 2010, the much-anticipated-iPad was released by the Apple Corporation. At the time, computing was relegated to “smart phones,” laptop computers, desktop computers and mainframe computers. The initial piece of hardware was 9.5 inches by 7.5 inches and featured a touch screen technology, which was first introduced on the iPhone years before. Comparatively speaking, the iPad's size fell roughly halfway between the MacBook's smallest 13-inch laptop and the iPhone, which was 4.5 inches by 2.5 inches. Because it shared the touch-screen technology, some suggested that it was merely an oversized iPhone. The critics reacted with mixed reviews.

Walter Mossberg (2010) of *All Things Digital* said it was nearly “a laptop killer”:

For the past week or so, I have been testing a sleek, light, silver-and-black tablet computer called an iPad. After spending hours and hours with it, I believe this beautiful new touch-screen device from Apple has the potential to change portable computing profoundly, and to challenge the primacy of the laptop. It could even help, eventually, to propel the finger-driven, multitouch user interface ahead of the mouse-driven interface that has prevailed for decades. (n.p.)

Mossberg estimated that roughly 20-percent of the computing we do on a laptop could also be done on the new tablet computer. A year later, Apple released the iPad 2 with many new features including front and back cameras that allowed users to begin video-conferencing over a new software program called “FaceTime.” This generation of the iPad proved to be the maturation of the technology. Now, suddenly, the iPad user had a complete media platform that included email, data storage, games, music, photography, telephony, television, video, video conferencing, web browsing and word processing; further, the platform included access to an application storehouse called the Apps Store, where third-party companies were crafting downloadable programs that broadened the reach of the tablet computer.

So, when the iPad came out, it was unclear how the public was going to receive it. As fate would have it, a series of computing and technological advances came along building the momentum that ultimately lead to the development of the iPad. And when the iPad finally did go public, it was well received. And while the critics were “meh” about the new technology, the public was lining up to buy the iPad. By October 2013, Apple had sold an estimated 170 million iPads since its launch in April 2010 (Ingraham, 2010). After the 2013 holiday shopping season, sales estimates had jumped to over 200 million iPad units (Souppouris, 2014).

The iPad also changed the way users interacted with their computers. Within six months of the iPad's release, two-thirds of the iPad owners were using the device from 1 to 5

hours a day; and 71 percent were saying the iPad was now their primary computer; and these same people used the device primarily for web browsing and social media participation (Goldman et al, 2010).

Clearly, the new device was a hit and Apple had once again devised a technology that filled an unidentified niche. Of course, many copycats did follow and now there is an entire tablet industry.

### **A Little History**

While the tablet computer is a relatively new idea, the concept of the “tablet” has been around since the inception of writing. The first tablets were clay or wood and were held by the user at a height near the chest so that marks can be placed upon them. The user would employ a stylus—a pencil-shaped piece of wood or reed —, which would leave marks in the clay. The tablet could then either be washed to clear the etchings or they could be fired in a kiln and baked and preserved. The earliest tablets date back to the Bronze Age. The initial writing was an ancient script called cuneiform, which lasted for more than a millennium (Wiseman, 1955; Innis & Innis, 1972).

Now, the purpose of the tablet and the stylus was to record things as an aid to memory. The first notes were numbers, used for accounting surplus inventories. Over time, the tokens and dashes were transformed into pictures and later an alphabet that ultimately formed words and sentences. Grammar and spelling were likely next developments (Burke & Ornstein, 1995).

The thing worth noting here was the fact that in addition to the inventions of alphabets, writing, grammar and spelling, the tablet also inspired a space for taking notes. Further, the human relationship with note taking took a form: the dominant hand became the one that made the physical marks and the other hand stabilized the clay tablet, or medium. This note-taking style has a history dating back 10,000 years.

Over the millennia, other variations of the tablet were created. As the actual media changed from clay, wood and stone to lighter materials including paper, a firm, pliant yet portable surface had to be created. Paper eventually was placed over a wooden surface and the clipboard was born (U.S. Patent Office, 1902). In the United States, the clipboard suddenly found favor with any professions that had to take notes standing up, including assembly linesmen, education, factory workers, law enforcement professionals, medical practitioners, military personnel, retailers, scientists, sports professionals, and so forth.

By 1980, the clipboard had become a tool for portable note taking and a digital form had been in the imaginations of the science fiction community. In the 1960s, various electronic models were demonstrated—at least in a fiction environment—on television. The popular science fiction show, *Star Trek*, for example, included a clunky black digital clipboard; the show also had something called a Tricorder, which was a hand-held multimedia device. Now, the first device—the clipboard—looks like a thicker version of the traditional clipboard and the characters used a stylus to write on the hard surface of the device. It wasn't entirely clear but it appeared that the device was absent any paper and that the hard-surface of the unit was the actual writing space thus making it the



medium. Next, the Tricorder was a portable data device that acted both as an environmental analyzer, a computer and a media recorder. Taken together, these devices offer the seeds for a real multimedia device. It was now up to the scientists and the engineers to catch up. Of course, several key components of the tablet computer had already, or were in the process of being developed.

The components, for the most part, break down into three distinct groups: hardware software and, finally, networking.

## **Birth of Computing**

Before there was the computer; before there was the calculator; there was the abacus. Invented by the Chinese as an accounting tool around the 1<sup>st</sup> or 2<sup>nd</sup> century BCE, this analog counting device evolved into a square-framed box with beads mounted on posts (McClellan & Dorn, 1999). The user would move the beads up and down the posts to establish accounting figures. The invention of this device altered human behavior substantially. Like writing, it allowed users to drift away from memory as the singular tracking method; it also allowed for more complex accounting practices; and—ultimately—more complicated math equations.

From here, clocks and other analog counting devices were created. In addition, the process of writing was born and the oral tradition was set aside; suddenly, humans were becoming very dependent on external memory devices. McClellan and Dorn (1999) put it this way: “Ultimately, writing came to supplant oral traditions and the skills and techniques of human memory. While the vast majority of early written records concern economic, legal, commercial, votive/religious, and administrative affairs, a significant literary component also came into being” (p. 62). A world of analog computing certainly followed.

In 1714, a prototype for a typewriter was created but the device wasn’t perfected until 1868 when a journalist/inventor named Christopher Latham Sholes revealed his design ideas. By 1874, author Mark Twain had purchased one for \$125 and became the first author to submit a typed manuscript to his publishers. A culture of typing soon followed (Freeman, 2009).

In 1801, industrialist Joseph-Marie Jacquard developed a loom that used punched cards to craft elaborate patterns into textiles. “In short, it was a programmed machine, the ancestors of digital computers,” writes Daniel Headrick (2009, p. 95). Now, the punch card allowed the machine to basically operate on its own. Overtime, the punch card—which was a piece of card board with holes punched into it—became the precursor for binary computing; therefore, the card either had a hole in a space or it didn’t; that system ultimately found its way into 20<sup>th</sup> century computer technologies.

In 1822, English inventor Charles Babbage (who is known as the “father of the computer”) began experimenting with steam-powered machines that could calculate a series of math problems systematically. One of his inventions—called the Analytical Engine—employed Jacquard’s punch card system, which allowed the machine to be

programmed for extended periods of time. Babbage experimented with the device for the next 50 years (Ceruzzi, 2012).

Concurrently, many scientists were experimenting with electricity. Englishman Michael Faraday is credited with having advanced the science enough that commercial applications could be made. In 1831, he had discovered electromagnetic induction, which is the principle theory behind the transformer and the generator (BBC, 2014). The telegraph became one of the first industrial products of the age of electricity and—in 1878—Thomas Edison filed his patent for the light bulb, which became the first commercial household electrical device.

Finally, it was British philosopher and mathematician Alan Turing who began developing ideas that became the basics for computer science. He created the concepts for the algorithm and the computation. He also devised a concept that the true value in computing is when one computer can duplicate the actions of another computer and vice-versa. This process is called the “Turing equivalent” and speaks to the massive linear value of computer automation (Tuescher, 2004).

With all the components in place, it was just a matter of time before someone began putting the pieces together. There were various attempts at computer design but it wasn’t until World War II that any serious work got done. It was Germany scientist Konrad Zuse who is credited with creating the first programmable computer, which he finished in 1941 and named the Z3.

Zuse’s machines, however, embody many of the concepts of today’s computers and seem more modern than their American counterparts—an astonishing achievement for someone working in relative isolation, and who was inventing and reinventing everything he needed on the way to what he called his life’s achievement: the computer. (Rojas & Hashagen, 2000)

Scientists in the United Kingdom and the United States were also working on their own systems and—by 1951—the first mass produced computer—the UNIVAC I—was in production and being sold at \$1 million each to corporations around the United States (Johnson, 2006).

In 1955, companies began replacing vacuum tubes in electronics with a new device called the transistor. The transistor was smaller, more efficient and cheaper to produce. Ten years later, the transistor was replaced by an even smaller device called the integrated circuit or “silicon chip.” From here, nearly anything was possible.

### **The TR-63 and a New Business Model**

After World War II, the United States and the Soviet Union engaged in a technological scramble to see who could invent better weapons. Concurrently, as U.S. forces occupied Japan, the Japanese were forbidden from rebuilding its military. The result? In the United States, the leading scientists and technologists went into began developing tools for the military; while, in Japan, the leading scientists and technologists went into developing

tools for commerce. It didn't take long for Japan to become a global leader in commercial technology.

Other countries have wondered what the secret of Japanese commercial success is. At first, there was certainly some copying of foreign technology. But the Japanese people were technologically literate, and after the war, Japan was forbidden to rebuild its armed forces. As a result, its best engineering minds went into consumer-oriented businesses rather than into the arms of industries as in the United States and the Soviet Union. (Headrick, 2009)

During this period of time, two unemployed scientists—Masaru Ibuka and Akio Morita—opened a small radio repair shop in Tokyo and began experimenting. When they learned of the invention of the transistor, they approached Westin House, which was one of the major manufacturers, and purchased a license to manufacture transistors in Japan. In 1957, they introduced the TR-63, a small, portable, transistor radio, which they retailed for \$39.95 (Headrick, 2009). This company ultimately became Sony Electronics.

The TR-63 is a landmark piece of consumer electronics. Whether it was implied or by accident, this radio established the model for modern consumer electronics. It was small, it was affordable, it was stylish, it was easy to operate, and it made use of an existing (radio broadcast) network. Because it was portable, it had an intimate relationship with its user. Prior to its invention, the standard box radio was large and, like a piece of furniture, designed to be placed in a stationary spot and left there. Basically, the traditional box radio was for family consumption; while the TR-63 could be carried around into bedrooms, to the beach, into the woods and so forth. This portability made it less available to others and more available to the owner. One cannot help but notice how the new modern listening device—the MP3 player—has many of these same attributes: it is small, it is light, it is stylish, it is affordable, it is portable, and it is intimate. (We'll return to this idea later on.)

If we deconstruct the Sony Electronics story a little bit, we can also find a business model here. Basically, Ibuka and Morita launched their own technology business through enterprise and guile. They also built a global brand and they did so from scratch in a small retail space. In the late 1970s, Steve Jobs and Steve Wozniak launched Apple Computers in much the same fashion. They started with off-the-shelf technologies, they built their own computer architecture and they found a market for their device. In most cases, their products were small, stylish and—relatively speaking—affordable.

### **Birth of Apple**

In the 1970s, Steve Wozniak and Steve Jobs were a pair of technology geeks living and working in and around San Francisco. From the outset, the pair of “Steves” had very different skills: Wozniak was a tech wizard and Jobs had a natural skill for salesmanship. In 1976, Wozniak built a homemade computer from scratch using old electronics and a computer chip called the MOS Technology 6502, which he discovered at the Wescon electronics show a year before. The guts of his invention were very simple: He used a standard Qwerty keyboard, a box-frame and wired it all through a standard television, which acted as the monitor. When Jobs saw the system, he approached Wozniak with a

plan to produce bare circuit boards, which they would sell to computer hobbyists for \$50 each. Wozniak agreed, and they built a prototype (Linzmayr, 2004).

Searching for customers, Jobs took the circuit board prototype to the Byte Shop, which may have been the first computer retailer in the country, and asked the owner if he wanted to stock the circuit boards. Seeing the potential, the owner ordered 50 units but asked—instead—that Jobs and Wozniak deliver complete computers, instead of just circuit boards. Jobs agreed and a \$25,000 order was created. This was a key moment in the development of the personal computer and the unofficial birth of Apple Computers (Linzmayr, 2004).

Armed with the success of this first deal, Jobs began scaling up borrowing more money and building lines of credit with suppliers; while Wozniak worked to improve upon the computing technology. And a year later, the Apple II was created. For software, Jobs contacted Microsoft and bought the licensing rights to put BASIC in all of the new Apple machines. Although the machines cost over \$1,000 each, they found wild success in the marketplace (Linzmayr, 2004).

By 1983, Apple had matured into a full-on computing company. It had passively allowed for the Apple II to die, while it placed emphasis on its new Macintosh line. Angered by the transition, Wozniak quit the company and Jobs ascended to a leadership role. It was from this position that Jobs determined the direction of the Apple product line and—more importantly—determined that the company would actively discourage third-party tech firms from developing software and hardware for Apple computers. It was over this and other troubles with Steve Jobs, that the Apple board ultimately removed Jobs from any management position and replaced him with an executive from Pepsi Cola named John Sculley; Jobs ultimately quit to form NeXT Inc.. That was in 1985 (Linzmayr, 2004).

By this point, the personal computer era was well on its way. IBM had also designed the architecture for a personal computer and then released the hardware schematics for its computer to the public. The idea here was to encourage third-party tech companies to write companion software for the system (Carlton, 1997).

What happened next, no one expected. Searching for a core operating system for its computer, IBM contracted with Bill Gates and his software-startup Microsoft for its BASIC program, and later for its MS-DOS operating system (Carlton, 1997). This decision empowered Microsoft to take the lead as the central software company in the United States.

Because most computers operate with a basic operating system, MS-DOS became the platform on which all other software would rise. To gain access to any PC performing on the MS-DOS operating system, third-party software companies had to pay licensing fees to Microsoft for that access. By 1995, Microsoft was the leading software company in the country and IBM had ceded most of its Personal Computing market share to a legend of “clone” PC companies; so, if you were using a personal computer in the United States, chances are you were working on MS-DOS (Carlton, 1997).

Now, as Microsoft began to dominate the software industry, Apple—with its guarded architecture—failed to compete. CEO John Sculley attempted to open the Apple platform up to third-party software and hardware companies, but Microsoft's near monopoly over the tech industry stalled Apple's rise. By 1994, things at Apple were dire; Sculley was fired and the new CEO Gil Amelio began laying off employees. In an effort to revitalize the company, Amelio bought Steve Job's venture, NeXT, because of its superior operating system and he hired Job's to act as a consultant. In 1996, the executive board, angered by years of losses and a record-low stock price, fired Amelio and replaced him with Jobs. Jobs immediately took to reinventing the company (Carlton, 1997).

During the next five years, Jobs returned Apple to profitability, he elevated the stock price and he redefined the consumer electronics industry with new gadgets and services. In 2001, he opened the first Apple retail stores and six months later, unveiled the first iPod, a portable MP3 player. In 2003, he introduced Apple's iTunes Store, an online content retailer that cross-integrated with the iPod, and suddenly, Apple was a leader again (Linzmayr, 2004).

### **Upstart from Outside the Paradigm**

Steve Jobs' success as an entrepreneur and technology innovator seems like a long shot. Clearly, he wasn't received very well in Silicon Valley. His background, his lack of formal education and his personality were factors. Jobs was brash, charismatic, inventive and brazen; he was also wildly competitive, prone to fits of jealousy and rage, and capable of acts of pettiness. He also had a natural gift for sales and salesmanship. In short, he was the perfect man to turn the global computing industry on its head.

At 20, Jobs was very young when he got involved with Steve Wozniak. At that time, most of the Silicon Valley industry was focused on defense and corporate technologies. The nation's leading companies included firms including AT&T, Eastman Kodak, Fairchild Semiconductor, General Electric, Hewlett-Packard, IBM, Motorola, Polaroid, Rand, RCA, Texas Instruments, XEROX, and a host of others. At IBM, for example, the culture was so buttoned down that workers were told they could only wear blue, brown or gray suits; brown or black shoes; and blue, white or yellow shirts. This was certainly not the kind of environment that would attract a guy like Steve Jobs.

Basically, Jobs was born to lead a paradigm revolution in personal computing. As Thomas Kuhn (1970) described in his book *The Structure of Scientific Revolutions*, often it was the outsider who upset the traditions of a given scientific paradigm. Again, Jobs was the perfect outsider: he had no college degree, he wasn't from a distinguished scientific family and he had no ties to the leaders of the Silicon Valley tech movement. He was like Einstein, a Jew in a Christian world, who worked as a patent clerk but found time to transform the physical sciences. Jobs did brazenly contact William Hewlett, but nothing really came of that contact (Linzmayr, 2004). So Jobs really was a true technology innovator—who demanded simplicity of design and usability in all the Apple products—and his influence continues to last.

## **iPod Culture**

When Apple revealed its first iPod digital music player in 2001, it changed the way people listen and store music. Now, the iPod is little more than a small data storage device that can house hundreds of digital music files, known as MP3 files. The design of the first unit was very simple: it was a sleek stainless steel unit, with a small viewing screen, and a headphone jack. What made the iPod curious was the simplified interface: On the front of the unit, there was a single button, which was surrounded by a circular click wheel. To operate the unit, one pushed the central button and then dragged their thumb around the touch wheel to scroll through songs, to raise and lower volume, and to pause or play music.

In his interview with the designer of the iPod, Rob Walker (2003) seemed almost astounded with its simplicity:

The surface of the iPod, white on front and stainless steel behind, is perfectly seamless. It's close to impenetrable. You hook it up to a computer with iTunes, and whatever music you have collected there flows (incredibly fast, thanks to that FireWire cable) into the iPod—again, seamless. Once it's in there, the surface of the iPod is not likely to cause problems for the user, because there's almost nothing on it. Just that wheel, one button in the center, and four beneath the device's LCD screen. (The look, with the big circle at the bottom, is reminiscent of a tiny stereo speaker.) (n.p.)

At the time, the product was just two years old but it had already redefined American culture. The iconic white headphone chords, for example, became a symbol of the new cool in America. That—and everyone was attaching a lowercase letter “i” to any word it wanted to associate to the hipness of the Apple culture.

Like the Sony TR-63 transistor radio, which came 50 years before, the iPod was small, it was portable, it was sleek, it was easy to use, and it was affordable. What it did lack, however, was a seamless infrastructure. The TR-63 had the global radio network; the iPod was really just an external hard-drive, which had to be attached to a computer and the user had to move songs from the computer to the iPod. To get songs, the user had to download sound files from CDs to the hard-drive of the computer and then, from there, over to the iPod. Something was missing but a solution was coming.

What came next was iTunes, the Apple digital retail store. To access it, users had to download software to their computers and, once activated, the software networked into the iTunes retail site online. From here, users could download music files at 99-cents per file (Walker, 2003). Now, it was possible to network into a huge storehouse of music and download freely. The iTunes + iPod matrix would change everything. In his book *Smart Things: Ubiquitous Computing User Experience Design*, author Mike Kuniavsky (2010) summed it up this way:

Two events provided the final pieces to the iPod's early success: the port of iTunes to Microsoft Windows and the iTunes Music Store, both in 2003. The resulting system offered a single user experience of digital music from the point

of music discovery to purchase, organization, management, consumption and sharing. (p. 121)

With iTunes, the Internet shopping experience became seamless, easy and ever present; and that development transformed the entire retail sector.

### **iTunes and the Future of Digital Commerce**

The birth of retail must have begun about the same time man began domesticating livestock and producing crops. With these developments came the reality of surplus—or over abundance—which certainly lead to sharing or, more importantly, bartering. This need for accounting created the technology of writing and from their numbers, words, grammar and bureaucracy. Searching for a date, the technology of writing dates back to 3200 BCE and was begun in the Fertile Crescent region in Asia Minor (McClellan & Dorn, 1999).

So retail was a likely offshoot of bartering, or the trading of two things of equal value. With the invention of money, barter became retail. Because retail was done face-to-face, retail centers were formed at centralized locations and trading districts sprung from there. It wasn't until the invention of dedicated postal system that individual commerce could be done over a long distance. The telegraph only further dissociated the relationship of face-to-face retailing; and then the telephone.

Communication Theorist Marshall McLuhan (1994) says the telegraph made the entire world accessible; meaning that anyone can speak to any other person provided each had access to the telegraph. McLuhan called the telegraph “the social hormone of the world” and he warned that the move towards electronic communication threatened to destroy the technology of the literate world. It also had the added effect of destroying the idea of space. Now, through the telegraph, two people could communicate with each other even if they are located hundreds of miles apart.

When a group of Oxford undergraduates heard that Rudyard Kipling received ten shillings for every word he wrote, they sent him ten shillings by telegram during their meeting: “Please send us one of your very best words.” Back came the word a few minutes later: “Thanks.” (McLuhan, 1994, p. 256)

Was this digital commerce? It was certainly an early example of its potential.

The commercialization of the Internet only escalated the globalism even further. In 1996, Bill Clinton signed into law the Telecommunications Act of 1996 into law. What this bill did was update the existing communication standards; it also designated what corporations could build out the cable television market, enter the telephony market and commercialized a government proprietary network called the Internet. As it happens, the initial bill was drafted by Senator Albert Gore Jr. (D-Tenn.), and that it was his committee that ultimately shepherd through the legislation. (He got into some trouble for claiming he invented the Internet, some years later, which was only partially true.)

McLuhan argued that the telegraph was an extension of the human nervous system; one might argue that the Internet was the fusion of humanity into one thinking organism. The Internet certainly took the middleman out of the equation. To send a telegraph, one had to visit a physical office and hand the text of the message over to an operator who typed it into a system that transmitted it and then transcribed it into text on paper; with the telephone, the user had to dial into a network and intercept the “receiver” of the call in real time: for telephone conversations to work, both parties had to be engaged with the process at the same time; and then came the Internet. With the birth of email, a sender could explain in great detail issues on a specific topic or topics and then send that message to a receiver. On the receiving end, the receiver did NOT have to be present and, in fact, the message would be stored and waiting for the receiver in a digital mailbox.

The Internet is now in the process of changing everything: the way we communicate; the way we bank; the way we shop; the way we make reservations; the way we pay our taxes; the way we pay our bills... and so forth. It’s also coming a storehouse of human thought. In his book *Glut: Mastering Information Through the Ages*, author Alex Wright (2007) argues that the Internet is becoming a storage space for collective human thought and that this information—while fleeting in the human experience—is lasting in the realm of the digital. He likened the Internet to a beehive, where the life of an idea can last much longer—twice the lifespan of a honeybee—and sustain in the public conscience of the hive. The Internet, he argues, is our collective thought.

Of course, shopping tools including iTunes are making our lives much easier. In 2003, iTunes became a key conduit for dissociated real-time retail. It was possible for a customer to log on to the site, shop for music and, with a few clicks, commence downloading media and consuming it. Again, the price was 99-cents per song and upward of \$10 per album.

In his book *Everything is Miscellaneous*, David Weinberger (2007) argues that the way consumers consume music has changed substantially. When album music—or pre-packaged music arrived in the retail community in the mid-1960s—consumers began buying entire collections of songs. Album music included 10 or more songs, which were loosely associated to one another; but, traditionally, there would be brief pauses in sound between each track. With iTunes, it was now possible to simply buy individual songs. So, instead of buying the entire “White Album” by the Beatles, it was possible to simply buy one or two tracks from the record.

Bundling songs into long-playing albums lowered the production, marketing and distribution costs because there were fewer records to make, ship, shelve, categorize, alphabetize, and inventory. As soon as music went digital, we learned that the natural unit of music is the track. This was iTunes born, a miscellaneous pile of 3.5 million songs from over a thousand record labels. (p. 9).

Since the iPod was first revealed in 2001, Apple has sold over 350 million units as of September 2012 (About.com). What’s more astounding is the volume of business the iTunes site did. On February 25, 2010, iTunes sold its 10 billionth song to a senior citizen in Woodstock, Georgia. The song? “Guess Things Happen that Way,” by Johnny Cash. Three years later, iTunes logged the sale of its 25<sup>th</sup> billion song (Owens, 2014). Today,



Apple is one of the top three Internet retailers globally. In 2012, it had \$8.8 billion in retail sales, making it third behind Staples and Amazon (Brohan, 2013).

Given the success of the iPod and its iTunes network, Apple moved quickly into cellular telephones.

### **The iPhone Revolution**

In June 2007, Apple released its first cellular telephone, the iPhone, and the “smart phone” movement was launched. Now, the idea of cellular telephone communications had been around for decades, but it was Motorola that first developed the first portable telephone device back in 1973. Its inventor was an engineer named Martin Cooper, who said his inspiration came from the television series, “Star Trek.”

“And suddenly, there was Captain Kirk talking on his communicator. Talking! With no dialing! That was not a fantasy to us... to me, that was an objective,” said Martin Cooper (Handel Productions, 2009). Cooper argued that because human beings are inherently mobile, the idea of creating a mobile communication device seemed natural.

The development of the modern cellphone actually had two major components to it: first, there needed to be a cellular network; second, there needed to be a viable, affordable communication device, or phone.

In the 1980s, the Federal Communication Commission began designating strips of radio spectrum for the cellular device industry. To dole out licenses, it actually started by issuing lottery tickets; anyone could buy in; and if the FCC pulled your ticket, you had the option to have a controlling interest in the radio spectrum inside a designated media market. In doing so, the FCC hoped to allow commercial interests to build out the cellular telephone infrastructure; and, in an effort to foster competition; it issued two competing licenses per media market. So, when lottery tickets were selected for the Baltimore-Washington LATA network, two licenses were actually granted. These heavily regulated duopolies existed until 1994, which is when the FCC decided to open all the markets up to third and fourth party vendors. Two years later, the Telecommunications Act of 1996 opened the door for the Regional Bell Operating Companies, or RBOCs, to enter the market; that law also determined that all participating cellular companies had to reach 90-percent of their customer base inside that established market by 2006. After much wrangling, many mergers, LATA exchanges and other horse trading, the cellular telephone market boiled down to four dominant cellular service providers; those include AT&T, Sprint, T-Mobile and Verizon.

At the same time, hardware makers began manufacturing cellphones. For the most part, the first devices were only good for telephone calls. Most were large—about the size of a traditional house phone—with big clunky buttons, a liquid screen that showed the phone number and an antenna. Overtime, as the hardware technology—chips and so forth—improved, the phones got smaller and lighter, the buttons got easier to use, and the liquid screens became larger. The prices for these units also lowered as companies began offering more and more services. By the early 2000s, it was possible to purchase a

cellphone that could do email, web searches, and some mapping; by 2005, it was possible to get a cellphone that offered subscription television and some music.

When a customer purchased a phone, he/she also had to sign a user contract that dictated a finite amount of user time, data use, and the contract came with two and three year term agreements. In exchange, the companies would offer discounts on the hardware.

In 2007, when Apple launched the iPhone (the iPhone 1) users had to subscribe with AT&T. At the time, nothing on the market even remotely resembled the Apple device. This phone was relatively small, it was light and like the iPod, it was a seamless piece of stainless steel with a large glass front and it only had one button. To activate it, the user simply pressed the button, and the screen would light up. From there, the user would just touch the screen pushing buttons and sliding digital leavers. In addition to telephony, the iPhone also worked as an MP3 player, a clock, a calendar, a camera, a mapping device and web browser. Again, nothing on the market was remotely like it. Further, given the touch-screen surface, there were no other moving parts on the unit; instead, users could type out emails using a touch-screen digital keyboard. Finally, the unit also had a gravitational device that allowed it to realize when the phone was being held horizontal and vertical.

There was a lot of commercial hype ahead of the iPhone's release, and many tech writers took shots at the phone, but David Pogue (2007), the tech writer for the *New York Times*, offered this review:

As it turns out, much of the hype and some of the criticisms are justified. The iPhone is revolutionary; it's flawed. It's substance; it's style. It does things no phone has ever done before; it lacks features found even on the most basic phones.

Unless you've been in a sensory-deprivation tank for six months, you already know what the iPhone is: a tiny, gorgeous hand-held computer whose screen is a slab of touch-sensitive glass.

The \$500 and \$600 models have 4 and 8 gigabytes of storage, respectively — room for about 825 or 1,825 songs. (In each case, 700 megabytes is occupied by the phone's software.) That's a lot of money; then again, the price includes a cellphone, video [iPod](#), e-mail terminal, Web browser, camera, alarm clock, Palm-type organizer and one heck of a status symbol.

The phone is so sleek and thin, it makes Treos and BlackBerrys look obese. The glass gets smudgy — a sleeve wipes it clean — but it doesn't scratch easily. I've walked around with an iPhone in my pocket for two weeks, naked and unprotected (the iPhone, that is, not me), and there's not a mark on it.

But the bigger achievement is the software. It's fast, beautiful, menu-free, and dead simple to operate. You can't get lost, because the solitary physical button below the screen always opens the Home page, arrayed with icons for the iPhone's 16 functions. (n.p.)

Pogue does point out that there are flaws in the initial design and warns that the biggest downside was the AT&T cellular network, which was (and is) anemic compared to Verizon. All that aside, he certainly loved the device and he didn't even touch on the potential growth.

Like the iPod, the iPhone could be networked through iTunes into the store. Suddenly, the iPhone was part of a larger digital enterprise. And, following Sony's TR-63 transistor radio model, the iPhone was small, it was sleek, it was user-friendly and it associated itself with not one but two established networks: the AT&T cellular network and, in time, to the Internet.

### **The Newton**

In the 1990s, there was chatter in Washington about a consumer electronic device called a "personal digital assistant," or PDA. The concept was to create a portable device that could act as a calendar, a notebook, and a telephone, among other things. Now, the PDA was an offshoot of the cellphone revolution and, the iPhone ultimately became one of the more successful versions of this, but the concept was born from the idea of a portable computer. Now, a series of companies made versions of the PDA and each met with varying degrees of success; for Apple's part, it launched the Newton, which included many of the features listed above. And while the Newton did find a small market, it never went on to be as popular as the iPod or the iPad. That aside, as part of its development, engineers wrote software that ultimately found its way into the Apple operating system software. Finally, the failings of the Newton became lessons for Apple and its next generation of consumer electronics.

### **The iPad Arrives**

So, the first iPad was revealed at an Apple conference in January 2010 and released to the public in April that same year. To many critics, the iPad looked just like an enlarged iPhone minus the telephony; to be honest, I cannot help but agree. The hardware is stainless steel with a glossy glass surface and a single button at the bottom of the front. Dimensionally, it was roughly half the size of a MacBook Pro and twice the size of an iPhone. But it was this shape and size that made its functionality unique. Because it was bigger than the iPhone, it allowed the user to do more things with it; one example would be word processing; because it had a touch-screen technology, the user worked with it much differently than they did with the MacBook Pro. Now, the laptop does offer more versatility: it has a traditional-size keyboard; more memory; a larger visual working space; and the potential to multitask. But, when most people merely use their computer to search the Internet, check email and make online purchases, the iPad begins to make more sense simply because it does all of these things and the touch-screen technology makes the interface experience more friendly.

I use the iPad primarily to check email and communicate with my wife (we live 500 miles apart). We use the Apple "Facetime" application to talk virtually face-to-face every night and while the contact is not ideal, the interaction is much more intimate than a mere voice telephone call. Further, the iPad, because of its third-part applications, is filled with all sorts of potential. There are hundreds of video games; scores of social networking

programs; and dozens of shopping programs. What's different here is that the application experience takes the web browser out of the mix. When we Internet shop on a desktop or laptop computer, we use a web browser—Yahoo! Google and/or Firefox—to dial into the web address of a favorite store. When we shop on the iPad, it is absolutely possible to download an application for that store and the web browser is removed from the equation. Removing the browser creates the illusion of direct contact with the vender; there is some latent security in that message.

### **Smashing the Prism**

When I started the research for this essay, I was asked to talk about communication theory and I offered a presentation on the media benefits of the postcard. During that research, I learned that the postcard was a dominant mode of communication from 1870 to 1920 simply because of the ease, convenience and balance of its standardize design: There is a picture on one side and a place for a written message on the other. Using McLuhan's theories on communication science, I argued that the postcard was a perfect medium because of the balance. The photograph on one side is consider a "hot medium" by McLuhan, or a medium that is quickly consumed; and the writing on the reverse side is considered a "cool medium", or a medium that takes concentration to consume. Fused together, the balanced media of the postcard presents an attractive model for all media: it should have the flash of the hot and the substance of the cool.

Which takes us to the iPad: The iPad is a very complicated media tool simply because it really is a toolbox filled with scores of mixed media, some are hot, some are cool. It is possible to download a modern novel or an ancient textbook onto the iPad and sit there reading it—and others—for hours on end; it is also absolutely possible to dial into the HBO application and look at hours and hours of movies. The books are cool, the movies are hot. In the process of doing so, we create a view history: libraries are formed on the hard-drive of this portable device that create a history of media consumption. For example, since I got my first iPod, I've accumulated 895 songs, which are all now available on my iPad. That history will be there as long as I have a relationship with iTunes.

### **So Here is the Thing**

Legacy media are dying. The news industries—TV, radio, newspapers, magazines—for example, are struggling with the Internet and cannot seem to find a model that will keep them solvent. Traditional television is about to suffer the same fate because most of the great television has left the "traditional" cable environment and is finding audiences elsewhere: Amazon Prime, Internet-based television and movies, is an example of that. HBO, which is still a very potent offering on cable television is attached to Time Warner Cable, but the parent company, Time Inc. is in the process of selling Time Warner Cable; when that happens, HBO, which already has an iTunes App, will likely jettison its cable-user-only relationship, and allow iPad users to simply pay a digital-only subscription fee. When that happens, I will likely be one of the first to complete rescind my relationship with the cable companies.

Which leads me back to the shattered plasma television. The flat panel television fell off the wall and shattered on the floor. When I finally determined what I was going to do with it, I picked it up and hauled it out to the street and leaned it against a garbage can on trash night. Within minutes, the garbage pickers in my community swooped in and made off with it. I missed it, but I got over it.

In fact, I set my television aside as quickly as I put aside my LP records, my CD player and my Sony Walkman. There are many things to be said about the changes here. Example: television is something you traditionally look at in your living room, the iPad, however, can go with me into the kitchen, the bathroom and the bedroom. Also, because my wife and I both have our own, separate iPads, occasionally, she'll go in one room and I'll retire to another and we'll watch two different things at the same time. Clearly, the technology critics—Jacques Ellul, Lewis Mumford, Neil Postman and a host of others—would certainly worry about this. With television, we'd gather as a family to share; with the iPad we separate as individuals for a more intimate relationship with media. There is a parsing of oneself away from the herd, so to speak; and while the turn towards the consumption of digital media may appear isolating and alone, it might actually be part of a greater fusing of humankind.

Is it possible that the iPad is merely the transmitter we use to communicate with the entirety of the digital herd? McLuhan certainly argued that telephony eradicated space, creating what he called a "Global Village." It is now entirely possible to engage in the global experience, speaking with people in distant places, sharing ideas and information, ultimately enhancing the social order of the world, flattening it, making it balanced and all at our fingertips.

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