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Senior Thesis

Turn On, Plug In, and Look Out: Changing Our Minds on Mind-Changing Technology

A “media” or “information technology” can be seen as any instrument through which a person can express raw information to be consumed by others. This broad term encompasses the written word, recorded audio, visual display, and any combination thereof; it also includes improvements and modifications on these innovations such as books, radio, and televisions, as all work toward the simple task of conveying information between people. Simply put, media technologies are tools for a person to communicate with one or more people—in other words, improvements of man’s natural communicative abilities. Since the advent of spoken word, the development of newer and more efficient media technologies has progressed exponentially, improving alongside technological developments such as the Gutenberg printing press, recorded and transmitted sound, and captured images on film. The 20<sup>th</sup> century brought with it a grand surge in these types of innovations, leading humans out of the Industrial Age and into the Information age—a change whose repercussions on society are only beginning to take effect. Digital information technologies are becoming more and more prevalent and are thus displacing those that preceded them, creating a colossal upheaval in the way people communicate with each other. This sweeping movement of digital dominance moves quickly like the technological world in which it holds roots; because of this, we are clearly in a state of shifting technological tides. While “Y2K” was often publicized as the worldwide web’s sole threat to the 20<sup>th</sup> century way of life, it is now becoming known

that the Internet can trigger sociocultural changes that can have considerably greater range and magnitude than the apocalyptic scenario predicted for the year 2000. Faced with this growing issue, it becomes necessary change one's perspective to more fully understand it. In this case, the necessary point of view is coming from the keen eyes of the 1960s philosopher, scholar, and author Marshall McLuhan—a pioneer in the studies of information-delivering technologies.

Marshall McLuhan's views on the progression and effects of media technologies put him at the forefront of media theory during his time; nowadays, as the Internet is revealing itself to be the epitome of the "electric technology" McLuhan predicted, his works are undergoing a renaissance, and many are reviewing his groundbreaking concepts in this new frame of reference. The main argument behind the theories of Marshall McLuhan is the idea that "the medium is the message"<sup>1</sup>; this oft-repeated quote was both coined and promoted by McLuhan as he overhauled time-honored ideas in his lectures, articles, and book entitled Understanding Media: Extensions of Man. Within these pages, McLuhan presents the idea that among information technologies such as books, radio, and television, the content of the medium is just the "juicy piece of meat carried by the burglar to distract the watchdog of the mind."<sup>2</sup> McLuhan argues that the way in which the medium affects the brain is more important than the content of the medium alone; this novel concept is what propelled him to success, and yet it was only one of many. Marshall McLuhan even went so far as to predict how media would affect our lives in the future; the universal struggle of which McLuhan foretold was the struggle

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<sup>1</sup> McLuhan, Marshall. *Understanding Media: Extensions of Man*. 2nd ed. New York: McGraw, 1964. Print.  
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<sup>2</sup> McLuhan 32

between “Gutenberg technology” and “electric technology,”<sup>3</sup> a clash between two antithetical modes of thinking: linear and non-linear. Linear thought, defined as the focused, sequential contemplation one experiences while reading a book, is the victim in this battle, as we are now witnesses to the great unraveling of the human brain by newer technologies. To many, the idea of this unraveling is disconcerting, and may evoke sentiments that are against the Digital Age altogether. However, arguments that denounce the Internet outright reject in the same breath the progression of media technologies entirely; the Internet is without doubt the next logical step in this series. Trying to evade the inevitable does not often bode well; instead of running from the connected age, we should look to tackle it head on and do as man has done for all of his existence: evolve. Through the same process that gave man the ability to walk on two feet, he will also gain the ability to harness the conglomeration of data known as the Internet; man’s adaptation to this ability is not just a helpful skill—it is his only safeguard against being overtaken by his own creations.

The evolution of information technologies has progressed over time in a recurrent and noticeable pattern of advancement and integration. History has reinforced this cycle constantly, for technologies that change the way information is processed often elicit similar responses in those using them. Personal reactions to these types of changes are usually fervid in nature due to the integral role that information technologies play in the lives of many. These tendencies can be traced back even to the development of written language in the western world; for example, in the Greek drama “Phaedrus,” Plato features a scene of dialogue between famed philosopher and orator Socrates and one of

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<sup>3</sup> McLuhan, Marshall. *The Gutenberg Galaxy: The Making of Typographic Man*. Toronto [u.a.: Univ. of Toronto Pr., 2002. Print. 136

his contemporaries concerning the topic of written language. Plato uses this work to express his concerns with the new creation, as Socrates says that reading “will produce forgetfulness in the minds of those who learn to use it,” and that those who rely on it will “not [be] wise, but will appear wise.”<sup>4</sup> Plato’s clear fear of the forgetfulness of future scholars illustrates his roots as an academic raised on the longstanding ways of oration; to him, straying from studying in the ways of formal speech would be an inexcusable act of heresy and one that would make him “a burden to [his] fellows.”<sup>5</sup> His worries were not baseless; in line with the words of Marshall McLuhan, the medium of the written word would prove to influence those that used it. In this case, the effects would produce results nearly equal to the fears of Plato, as the memorization of information was no longer necessary when it could be written down. This streamlining of the human interaction with information has been a frequent component of information technology’s progression throughout the ages; innovations such as the Gutenberg printing press, radio, motion pictures, and television are examples of the constant goal of getting more information to the masses more quickly than ever before.

Technologies, though, can also have effects that are more profound in the context of the individual; an example of this is the transformation of the clock and human comprehension of time itself. Timekeeping was a popular way to increase overall efficiency around the era of the Industrial Revolution; large clock towers would announce the beginning and end of the workday, and people’s lives began to revolve around them. However, as advancements in clock production made them smaller and more mobile, the act of timekeeping became a more personal affair, a change that had notable

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<sup>4</sup> Plato. *Plato in Twelve Volumes*. Trans. Harold N Fowler. Vol. 9. London: Harvard University Press, 1925. 12 vols. *Perseus Digital Library*. Web. 2 Dec. 2011. 275a-b

<sup>5</sup> Plato 275a-b

repercussions on those who possessed them. Media technology expert Nicholas Carr observes that the “personalization” of measured time was a “major stimulus to individualism” that was “a more salient aspect of western civilization,”<sup>6</sup> and rightly so; time has since invaded every facet of life in society such that humans are no longer animals that rely on the sun to regulate their activities but instead rely on machines. These profound effects only give more support to the laws of the medium’s impact on the user, and have been noted in similar situations elsewhere. Another, more recent example of Marshall McLuhan’s predictions being reinforced is something referred to by the Brookings Institution as the “CNN effect,” or “the impact of 24-hour-a-day, live television coverage broadcast from around the world by all-news cable channels.”<sup>7</sup> This by-product of the Information Age has demonstrated its might already through its effects that are not only social, but also political. The CNN effect is frequently cited as the cause for events such as the 1992 deployment of U.S. troops to Somalia after its famine was documented on TV; the transported suffering of the Somali people prompted U.S. troops to go there as aid—and the subsequent portrayals of tragic U.S. deaths motivated their immediate withdrawal,<sup>8</sup> as documented by the World Politics News Review. From these examples, it becomes easier to perceive the intrinsic patterns in the way society reacts to expanding media technologies regardless of the era; McLuhan’s idea of “personal and social consequences of any medium... [resulting] from... any new technology”<sup>9</sup> is a timeless factor of human existence. Therefore, having progressed this far in the rise of

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<sup>6</sup> Carr, Nicholas G. *The Shallows: What the Internet Is Doing to Our Brains*. New York: W. W. Norton and Company, 2010. Print. 43

<sup>7</sup> “‘The CNN Effect’: How 24-Hour News Coverage Affects Government Decisions and Public Opinion.” *The Brookings Institution*. Brookings, 22 Jan. 2002. Web. 25 Jan.

<sup>8</sup> “Famine in Somalia and the ‘CNN Effect’.” *World Politics News Review*. Wordpress, 18 Aug. 2011. Web. 24 Jan. 2012.

<sup>9</sup> McLuhan, *Understanding Media* 7

the Internet, it is important for one to question how these currents of society are taking shape right now—or if there are even greater factors yet to be accounted for churning just below the surface.

The Internet may be the first in a long line of media technologies to break the chain of similar trends present in all its predecessors due to the fundamental differences it has in comparison to them. The Internet is, foremost, an “all-purpose medium”<sup>10</sup> in that it can deliver an array of contents that were once separated to their own individual outlets. Text, speech, music, video, and images are all transmitted over the Internet with ease; therefore, it has since served to replace the channels that once specialized in the handling of these types of information. This displacement of former technologies is a growing trend based on the Internet’s encroachment into other forms of entertainment; the Associated Press has stated that between April and June of 2011, 200,000 Americans cancelled cable television subscriptions in favor of using the Internet to watch their favorite programs.<sup>11</sup> Similar cases of vanishing media, such as books and CDs, only further exemplify the fact that people’s connection with the Internet is changing rapidly. UCLA professor Christine Borgman has asserted that “as people increasingly use computers... human-computer relationships become more than a relationship between one person and one computer,” and that with computers the “relationship between task and action [has become] more abstract” over time.<sup>12</sup> Her views emphasize the increasingly complex relationship between humans and computers that, in line with

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<sup>10</sup> Carr 6

<sup>11</sup> AP. "ConsumerWatch: More Americans Ditching Cable, Satellite TV." *CBS San Francisco*. CBS Local, 10 Aug. 2011. Web. 25 Jan. 2012.

<sup>12</sup> Borgman, Christine L. *From Gutenberg to the Global Information Infrastructure: Access to Information in the Networked World*. Ed. William Y. Arms. Cambridge: The MIT Press, 2000. Print. Digital Libraries and Electronic Publishing. 163, 140

previous technological interactions, are becoming tools that eventually shape their users. Differences within the Internet, though, present new hurdles for its operators; for just as the Internet can be seen as a compilation of the media technologies before it, so too is its overall influence a compilation of the effects of those media technologies. Furthermore, as a byproduct of the rejection of physical media, the Internet has changed the way in which we receive information as well; in experiencing media, what used to be a steady and linear flow of isolated information, such as that in a book or a compact disc, has now become an indeterminate mass of heterogeneous data that is quick to overwhelm the mind of the consumer. This information overload assists the “dissolution of the linear mind”<sup>13</sup> that McLuhan predicted would happen in the future of electric technologies. This phenomenon, though, is only a side effect of the great influence the Internet has on the brain, which is rooted in the very science of how it processes one’s surroundings on a daily basis.

In order to scientifically understand the influence of the Internet on the brain, one must first grasp two concepts: neuroplasticity and the working memory. The Net can be seen as a highly mentally engaging experience, and thus it has a constant impact on how the brain works. Neuroplasticity is the ability of different sections of the brain to alter and rearrange their order in response to certain stimuli.<sup>14</sup> Though a relatively new field of study in the field of psychology, it has still seen revolutionary breakthroughs and has become a crux of all further studies in the domain of neuropsychology. One such inquiry into the topic featured recently in *Nature* magazine observed the brains of congenitally deaf cats and found that their “deprived cerebral cortices... [had] been reorganized by the

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<sup>13</sup> Carr 1

<sup>14</sup> Carr 15

remaining sensory modalities through cross-modal plasticity.”<sup>15</sup> In other words, the areas of the deaf cats’ brains that would usually be dedicated to processing sound were “recruited” by other parts of the brain to perform new functions such as sight, in which case the cats were found to possess “superior visual perceptive abilities.”<sup>16</sup> This example of neuroplasticity in action does not only reflect plasticity in the brains of cats, but in humans as well, since according to a study by the Tufts University College of Veterinary Medicine, “the physical structure of [a human] brain and that of cats are very similar... [Both] brains function the same way, conveying data via identical neurotransmitters.”<sup>17</sup> The brain’s incredible capacity for complete reorganization is present throughout all of one’s life. In the context of history, neuroplasticity has allowed humans to adapt to face new challenges as they arise; paleoanthropologist Dr. Rick Potts of the Smithsonian Institute has called human evolution the “survival of the more versatile” and that “the more general and flexible creatures... persist over time.”<sup>18</sup> Plasticity of the brain can be both a benefit and detriment to the individual, as it has the potential to lock the mind into behaviors that are habitual yet not necessarily desirable; this is a noteworthy aspect of neuroplasticity when examining the Internet, as constant interaction with the information superhighway can cause the brain to strive to become efficient in its navigation.

Acclimation to the method in which one receives information is a technical view of Marshall McLuhan’s deductions on these technologies; it is a neural accommodation that

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<sup>15</sup>Kral, Andrej, Stephen G. Lomber, and M. Alex Meredith. “Cross-modal plasticity in specific auditory cortices underlies visual compensations in the deaf.” *Nature Neuroscience* 13.11 (2010): 1421+. *Gale Science In Context*. Web. 2 Dec. 2011.

<sup>16</sup> Kral

<sup>17</sup> "How Smart Is Your Cat?" *Cat Watch Newsletter*. Cornell University College of Veterinary Medicine, Feb. 2010. Web. 22 Jan. 2012.

<sup>18</sup> Potts, Rick. "The Adaptable Human." Interview by Graham Townsley. *NOVA*. WGBH, 26 Oct. 2009. Web. 25 Jan. 2012.

all users new to the Internet face at some point, and its effects can be seen in any change the Internet has on the way we think and act. For instance, it has been shown that the Internet can change how one reads; recent study conducted at University College London looked at a wide range of web users and found that many who read information through online source engage the computer page not through traditional reading, but through “power browsing,”—a method of scanning a document for relevant information while not reading it fully.<sup>19</sup> This is a true example of the unraveling of the human mind McLuhan predicted that also shows how the Internet has changed the way we seek information.

Dr. Torkel Klingberg of the Stockholm Brain Institute defines the working memory as a system of the brain that grants us “the ability to remember information for a period of time” usually in the span of “seconds,” and then to synthesize this information into stored knowledge.<sup>20</sup> It is one of the few functions of the brain that is operational during all moments of consciousness, and is therefore essential to normal daily function. Psychologist Kendra Cherry has detailed that the processes of working memory take place in both the frontal lobe—the area responsible for the processing of cognition and motion—and the parietal lobe—a region dedicated to somatosensory and other sense-related activities;<sup>21</sup> working memory is accordingly at the intersection between these two roles, as it works to interpret the raw brain data we encounter every waking moment of our lives and fuse it to ideas we already possess. To live without working memory would be comparable to thinking like a newborn baby, who does not develop this system until

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<sup>19</sup> Carr, Nicholas. "Is Google Making Us Stupid?" Editorial. *The Atlantic*. The Atlantic Monthly Group, July-Aug. 2008. Web. 26 Jan. 2012.

<sup>20</sup> Klingberg, Torkel. *The Overflowing Brain: Information Overload and the Limits of Working Memory*. Oxford: Oxford University Press, 2009. Print. 49

<sup>21</sup> Cherry, Kendra. "The Anatomy of the Brain." *About*. The New York Times Company, 2011. Web. 2 Dec. 2011.

seven months of age; as Klingberg puts it, daily experiences to infants are little more than a “continual influx of impressions,”<sup>22</sup> and as such are never processed fully in terms of other knowledge. Even in a more developed brain, though, working memory has its limits; multi-tasking or trying to think about many things at once can strain working memory, for it possesses a limited capacity. Thinking in this way is a routine occurrence for habitual users of the Internet, and thus it is common for them to undergo side effects not faced by more linear thinkers. A study from the Jianxi Blue Sky University in China recently supported this belief after scanning the brains of two groups of teenagers: a control group, and a group of Internet addicts. The scans found “damage of the working memory” sections of the brain in the Internet addicts that were not present in the control group<sup>23</sup>; this provides strong evidence for the potential for cognitive harm due to the Internet. Those who constantly stress working memory with information overload are prone to losing some of its competence; diminished memory and focus abilities are often the consequences. These adverse effects alone, though, are usually not enough to deter inveterate Web-users. Torkel Klingberg has remarked how humans possess an “interesting tendency... to push [their] boundaries”<sup>24</sup> when it comes to information overload. This mere aftereffect of human curiosity is both a blight and blessing for the intellect; in its quest for expansion, it can easily find itself overwhelmed.

With these two systems understood, the broader image of the Internet’s impact on the brain is more easily brought into light. As previously indicated, periodic Internet use can cause the brain to rewire itself to adapt to a life of browsing; the plastic brain

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<sup>22</sup> Klingberg 57

<sup>23</sup> Xiong, Jianying, and Leiyue Yao. "The research of event-related potentials in working memory of the juvenile internet addiction." *E-Health Networking, Digital Ecosystems and Technologies (EDT), 2010 International Conference on* 1 (Apr. 2012): 93 - 95 . Web. 22 Jan. 2012.

<sup>24</sup> Klingberg 166

optimizes the ability to handle multiple stimuli by filtering them off indiscriminately. While the changes that occur may appear to be completely clinical, they are in fact very immediate, and their deleterious effects amplify in direct relation to the frequency of one's Internet use. As the brain acquires proficiency at a certain task, that task becomes all that the brain strives to perform. Similar to the method through which a craftsman develops a trade, the brain acquires skills at navigating cyberspace and seeks incessantly to use them. Internet mastery is unlike other skills, though, due to the medium's personal and interactive nature; like the introduction of measured time, connected thought is shaping our intellect in ways outside of its intended use. Without regulation on the amount of time spent on the Internet, neural optimization can take a turn for the worse. The mind that could once manage deep concentrated thought can become akin to a "data-processing machine"—as described by Nicholas Carr, the owner of this brain can then become like a "lab [rat] constantly pressing levers to get tiny pellets of social or intellectual nourishment."<sup>25</sup> And it is this nourishment—this mental treat—that keeps bringing us back for more; the Net provides the intoxicating "feeling of getting smarter,"<sup>26</sup> as Carr put it, that humans crave and can easily get hooked upon. Regardless of the presence of actual cerebral substance in the treat, it provides nonetheless a captivating euphoria that journalist Virginia Heffernan believes would have attracted the type of "young, dreamy mind... that in earlier eras might have been drawn to novels or movies."<sup>27</sup> In the past, these minds would have satiated their knowledge-fix through partitioned media outlets; these days, the walls between those media outlets have been

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<sup>25</sup> Carr 117

<sup>26</sup> Carr 10

<sup>27</sup> Heffernan, Virginia. "Miss G.: a case of internet addiction." *New York Times* 10 Apr. 2011: 11(L). *General Onefile*. Web. 3 Dec. 2011.

broken, and with them the lines that once separated “passion” and “addiction.” In modern times, these peoples’ pastimes could very well turn into dependencies, opening up the potential for an unhealthy relationship between medium and man.

The allure of the Internet has placed it near the level of a drug, for in its upheaval of all other media it has become an ultimate source of entertainment and information. The Internet fits the criteria of a drug outstandingly; it is relatively cheap, not physically harmful, completely personalized, infinite in dosage, and most definitely mind altering—thus giving it a mass appeal as virtually anyone can use it for their enjoyment.

Consequently, the number of people succumbing to its grasp is burgeoning; journalist Haima Deshpande spoke of a 10-city survey in India that found out that the number of youths who admit to being “on the web for over five hours a day”<sup>28</sup> has risen to 50 percent, a staggering number considering the youth of the Internet as a medium—and this trend is showing no signs of slowing down. Accordingly, commensurate shifts in behavior are taking place in the minds of these users—a progression that can be viewed with a simple check of their Google searches; over the past several years, search traffic for the phrase “how to focus” has increased substantially, proving how more and more people are being influenced by their mind-altering virtual interactions.<sup>29</sup> (See *Figure 1*) For the many individuals who have input these search terms as a way to escape the consequences of their Internet use, it is clear that the neuroplasticity of the mind has made them adapt to the Digital Age in an undesirable fashion; in the end, they are displeased by the effects of this new medium. They reflect the large group transitioning

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<sup>28</sup> Deshpande, Haima. "Trapped in the Net." *Contify.net*. Open Media Network Private Limited, 2011. Web. 1 Dec. 2011.

<sup>29</sup> "Google Search Traffic for the Phrase "how to Focus"" Chart. *Google Trends*. Google. Web. 2 Dec. 2011.

into the Connected Age who are “unaware that they are addicts,”<sup>30</sup> Deshpande claims, and that is the best descriptor of their situation: they are “dependent on something that is psychologically or physically habit-forming,”<sup>31</sup> as the Princeton Wordnet Database defines. Unlike other addictions, the Internet is especially hard to overcome due to one thing: its prevalence in society today. The fact that the Internet is “so much a part of daily existence” contributes to the “[high] risk of relapse”<sup>32</sup> in those trying to kick their addictions, as Haima Deshpande discovered in India. Unlike the case with addictions such as substance abuse, complete abstinence is not an option for those who wish to maintain a basic competence in most of society; the Internet has become so ingrained in the lives of so many, to go without it would be to deprive oneself of many opportunities. To overcome this paradoxical situation, one should search for a middle ground in their dependence, taking control of it before it does the converse. By taking control of our addiction to the Internet, we learn to use it as a tool—as an “extension of ourselves”<sup>33</sup>—and begin to fulfill the prophecy Marshall McLuhan envisioned over 50 years ago.

Erinn K. Walsh of the Cambridge Health Alliance contends that “for some people, under certain circumstances, [addiction] might serve some adaptive function.”<sup>34</sup> It is within this frame of mind that one must look at the transformation of the Internet from dependence to tool as the next step in the evolution of the human species; or even, as writer Thomas Rogers believes it to be, “the ultimate evolutionary adaptation.”<sup>35</sup> Despite

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<sup>30</sup> Deshpande

<sup>31</sup> "addiction." Def. 1. *Princeton WordNet*. Princeton University, n.d. Web. 26 Jan. 2012.

<sup>32</sup> Deshpande

<sup>33</sup> McLuhan, *Understanding Media* 7

<sup>34</sup> Walsh, Erinn K. "Addiction & the Humanities Vol. 3(4) - Addiction and Technology From Sex to Drugs: Considering Evolution and Addiction." Editorial. *The Brief Addiction Science Information Source (BASIS)*. Cambridge Health Alliance, 9 May 2007. Web. 25 Jan. 2012.

<sup>35</sup> Rogers, Thomas. "The Internet: Triumph of human evolution." Editorial. *Salon*. The Associated Press, 4 Dec. 2011. Web. 26 Jan. 2012.

its potential for abuse, the Internet continues to exist on the cutting edge of technology and society; it has been cemented into this place where books, radios, and televisions used to be yet no longer are. This place is its rightful one on the timeline of the evolution of the relationship between man and tools, dating back millions of years even before the arrival of Homo sapiens.<sup>36</sup> Anthropologists studying early Homo-species' use of tools have come to the conclusion that as the use of primitive stone tools became more popular, "tool use may have driven the further evolution of the human hand."<sup>37</sup> Once again, we encounter an instance where the method of doing something, changed by new technology, has gone on to have, as Mark Federman of the McLuhan Program in Culture and Technology has said, "unanticipated consequences"<sup>38</sup> on those that use it. These apparent connections are testament to the deeply logical nature of McLuhan's ideas and proof of the stability in his rationale. Even on an evolutionary scale, the tenets of McLuhan's ideas exhibit profound similarities with scientific findings; this alone should be persuasive enough to attract the attention of those interested in making sense of the burgeoning Digital Age. Following McLuhan's projections even further, the next step in his evolutionary process presents a scenario that is both wildly imaginative and seemingly imminent: if we are able to truly use the Internet as a tool for connection—an extension of man—and not just personal diversion, we may be able to bring into fruition Marshall McLuhan's vision, or perhaps his dream, of a "global village,"<sup>39</sup> a community where every human being can be connected to each other at once. Christine Borgman

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<sup>36</sup> Primates tools

<sup>37</sup> Freeman, Scott, and Jon C Herron. "Dexterity and Early Tools." *Evolution Library*. WGBH, 1998. Web. 23 Jan. 2012.

<sup>38</sup> Federman, Mark. "What is the Meaning of The Medium is the Message?" *UTORweb*. University of Toronto, 23 July 2004. Web. 24 Jan. 2012.

<sup>39</sup> McLuhan, *Understanding Media* 46

touts the potential of the Internet to become an idyllic network of “information in all the world’s languages, [available] to all people, all the time”<sup>40</sup> that could arise if we evolve to optimize the inherent potential the Internet gives to us: the ability to communicate with many people very easily. The late satirist Bill Hicks once likened the existence of mind-altering substances to an “accelerator pad for our evolution,”<sup>41</sup> an opinion that retains validity in the context of the Internet as a mind-altering experience; however, in this context, the Internet acts to expand the mind and to give us a glimpse into the “Mind at Large,” Aldous Huxley’s idea of a person being able to perceive “everything that is happening everywhere in the Universe.”<sup>42</sup> Through the vast amounts of user-generated content, informational databases, and entertainment libraries available on the Internet, reaching that state of being—and, consequently, a heightened state of evolution—has become more accessible than ever.

In line with its numerous predecessors in the lineage of information technology innovations analyzed by Marshall McLuhan, the Internet will always act upon humans as long as humans are acting upon it. Equilibrium between these two opposing forces must be found to maintain control over the technology that humans create, for as with any tool, maintaining control over it will always ensure to maximize safety for the user. Balance in this relationship will only be found through man’s adaptation to working with this tool. Adaptation is the welcome and necessary next step in the evolution of man; adaptation to the Internet is vital for our health, for our prosperity, for our minds, and most importantly, for our lives.

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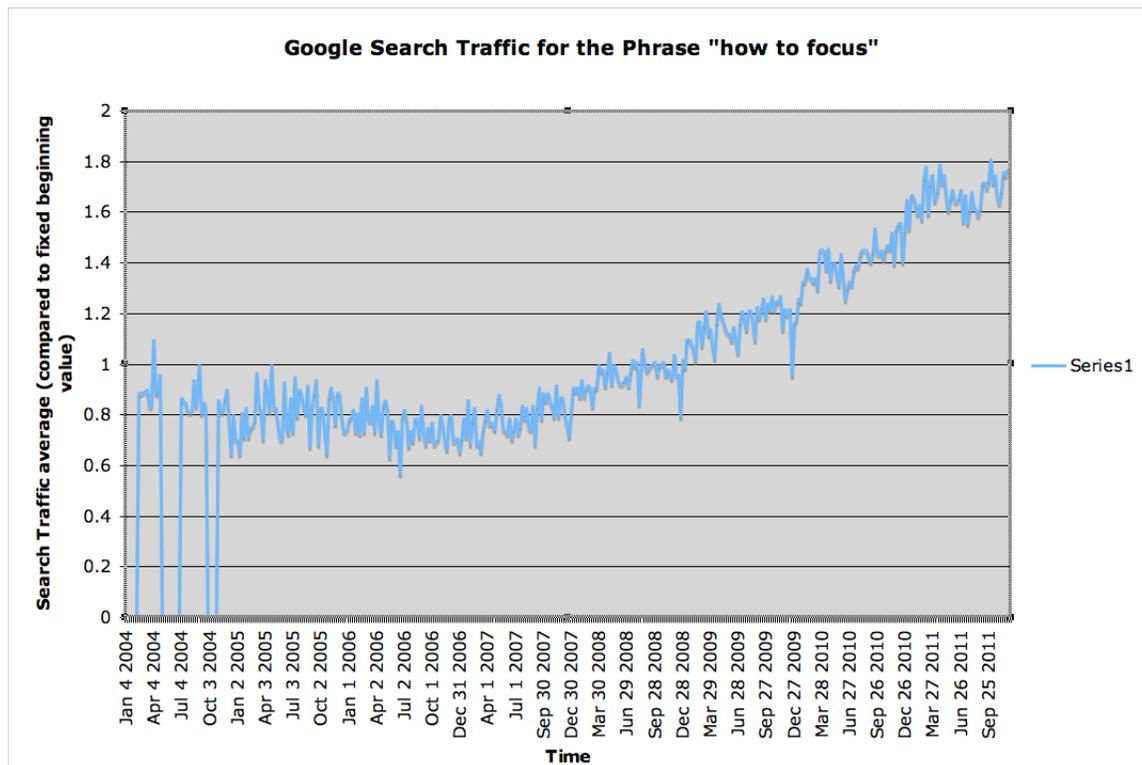
<sup>40</sup> Borgman 209

<sup>41</sup> Hicks, Bill, perf. *Revelations*. Chris Bould. *YouTube*. Google, 29 July 2006. Web. 26 Jan. 2012.

<sup>42</sup> Huxley, Aldous. *The Doors of Perception ; And, Heaven and Hell*. New York: Perennial Library, Harper & Row, 1990. Print.

## Appendix

Figure 1



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