Reclaiming Craftsmanship

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ABSTRACT

In upcoming years, many institutions in the private and public sectors will lose valuable organizational knowledge due to organizational restructuring, departmental consolidation, retirements and attrition. This can have a potentially crippling effect on organizational effectiveness and service delivery. Organizations need to establish processes and develop tools that allow them to capture employees' *know-how-and-know-what*, and disseminate that information and knowledge to other employees. In the age of the 'digital economy,' the temptation appears to be to introduce technology to capture codifiable data, resulting in the inadvertent undervaluing of the personal knowledge and expertise accumulated by their employees over many years of practical experience.

My focus is on personal knowledge, particularly concerning acquisition and transmission. Approaching the research from a post-positivist as well as a pragmatist approach, I have sought to identify and understand the factors that influence people to share knowledge and conversely how people learn from others, through mentoring for example. Within this context, I advocate for the return to the spirit of craftsmanship and reclaim the ideas of learning by doing, having more human-to-human connections to learn from, and taking the time to be engaged in mastering a practice. My goal has been to question rather than to pursue a definite explanation for how the acquisition and transmission of personal knowledge unfolds. As a pragmatist, I approach the idea of knowledge as a derivative of our engagement and active experience with the world. To this end, I added an applied element to this dissertation; I have included a working prototype of a platform for people to share their skills and interact with others in their network. This software

application also acts as a repository of data for my research and for topics related to personal knowledge. For example, it includes an 'Alphabet of Personal Knowledge' wherein I briefly examine the etymology and use of selected words in the context of knowledge acquisition and sharing. My interest lies in using multi-dimensional methods that complement each other with the express goal of creating new knowledge that can in turn be used to improve mentoring and knowledge sharing programs.

To the poet Marcial Salas, my father and my most influential mentor

Acknowledgements

Alejandro Salas-Strus. 2018

Acknowledgements

A significant number of people have contributed to my learning journey and to the completion of this dissertation by either directly providing me with information, feedback and encouragement, or by authoring the research papers and the books that inspired this research. This has been an incredibly difficult but ultimately rewarding experience for me and there are many people I need to thank. I must apologize in advance for the inevitability of inadvertently neglecting to include all who have helped me during these last several years. You should know that I will forever be grateful.

Special thanks to my dissertation committee: Dr. Ed Slopek (Supervisor), Dr. Steven Bailey, and Dr. Michael Murphy.

Several years ago, I had the good fortune of meeting Dr. Michael Murphy while we were exploring the possibility of collaborating on a project. During one of those meetings, Michael encouraged me to pursue a PhD and suggested I consider Ryerson. Michael rekindled my desire to go back to school. A few months later I decided to research graduate programs more seriously, and I found the York-Ryerson Joint Graduate Program in Communication & Culture. Dr. Steven Bailey reviewed my application and took a chance by letting me take on this challenge part-time after many years of being away from school. I can't thank Steve enough for believing in me even when I had doubts.

The first two courses that I took were exhilarating and very helpful in preparing me for this journey. One of my professors was Dr. Ed Slopek. I was mesmerized by his method of teaching and the care he showed in preparing for the class and delivering the lectures. When I approached him to ask him to be my supervisor for my dissertation, I was anticipating a polite

"Sorry I cannot help you. I am too busy," but instead, I received an enthusiastic "Yes. Let's do this together!" At that time, I didn't understand what he meant when he used the word 'together,' but now I know. Ed has always been there for me, not only opening new doors for me to explore and lending many books to use in the research, but also pulling me out when I got stuck and couldn't move forward, guiding me without telling me what to do, and helping me have the best possible experience in this program. No words can describe my enormous gratitude towards Ed.

I must thank all the individuals who participated in my interviews/survey. Their ideas were invaluable to me, and although I am certain that I was not able to transfer their knowledge to me, I benefited tremendously from listening to their stories about their personal growth and how they became what I would consider 'craftsmen' and 'experts' in their fields.

I must also thank Alejandro Salas Strus who patiently read numerous versions of my drafts and provided valuable feedback. He also contributed with several original illustrations.
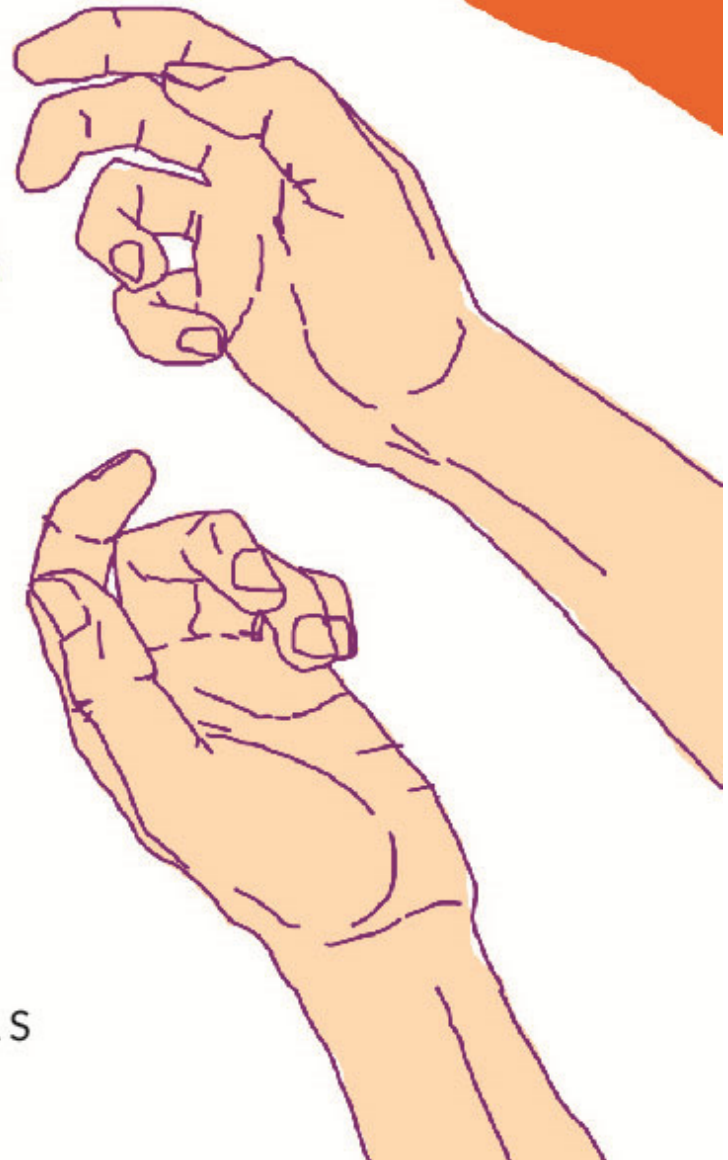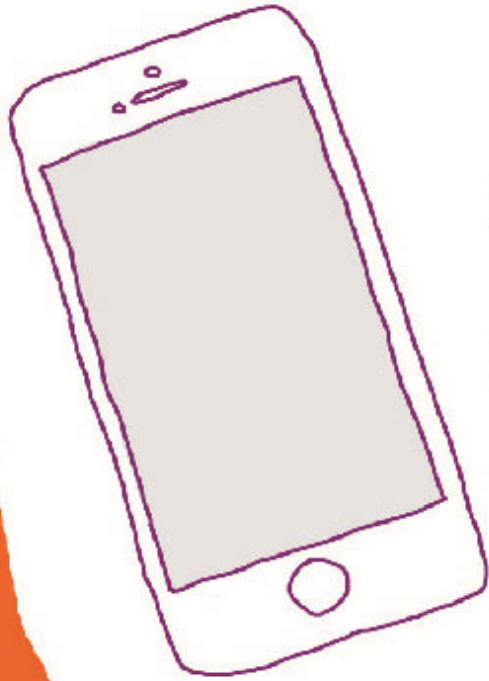
I could not have made it to the finish line without the editing help and guidance from Lucy Anacleto. She was not only diligent in her work, but very patient and supportive. I feel very fortunate to have worked with Lucy.

Lastly, I would like to thank my family for their constant encouragement and for allowing me to take the time to do this dissertation. My eternal gratitude and love to my wife Jane, who hopes to one day reclaim her husband from the clutches of his desk.

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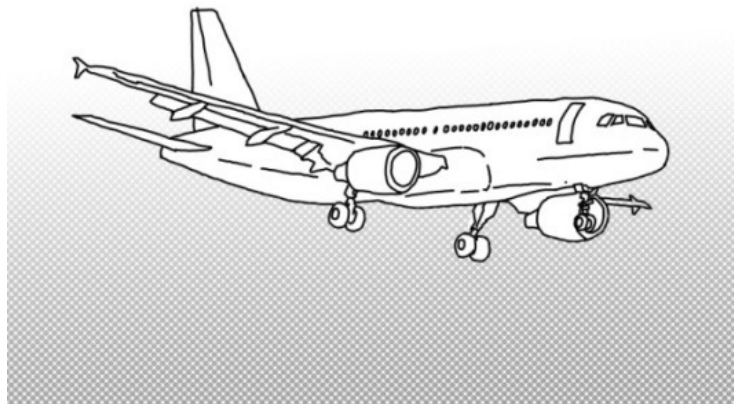# RECLAIMING CRAFTSMANSHIP

GIOVANNI SALAS

Preface

The Story of the Landing on the Hudson River

PREFACE

"Something told the wild geese
It was time to go,
Though the fields lay golden
Something whispered, "snow."

Something told the wild geese
It was time to fly.
Summer sun was on their wings,
Winter in their cry."

Rachael Field (1849-1942)

"*Both in the air and on the ground, I was shaped by many powerful lessons and experiences – and by many people. I am grateful for all of them. It's as if these moments from my life were deposited in a bank until I needed them. As I worked to safely land Flight 1549 in the Hudson, almost subconsciously, I drew on those experiences.*" (Chesley C. Sullenberger III, 2009, p. 2. Emphasis mine)

In New Jersey, the morning of January 15, 2009 began with light snow, heralding the passing of the fast-moving winter storm that raged the day before. By the afternoon the skies were clear and there was a typical winter chill in the air. The air temperature hovered around -5 degrees Celsius with northerly winds of less than 15 km/h. The Hudson River rippled gently. At 3:31 pm, this river was to serve as the emergency runway for Captain Sullenberger's 10-year old, European-made Airbus A320. There were 150 passengers and 5 crew members on board. Captain Chesley Sullenberger III (known as Sully) successfully landed US Airways Flight 1549 a few minutes after departing from the New Jersey airport, La Guardia. At about 3,000 feet above the Bronx, a flock of Canada geese flew into both the plane's engines, resulting in

complete engine failure. The geese, flying with their feet tucked under their tails and their necks extended, were presumably paying more attention to the energy efficiency of their V formation than to the oncoming aircraft. The flock was likely traveling at around 60 km/hour, the airplane at about 240 km/hour. In an instant, the flock of geese was dispersed and the 150,000-pound Airbus A320 became a giant glider. Most people learned about the "Miracle on the Hudson" story from news articles, television clips or from the Hollywood movie of 2016. The perspective that I would like to highlight in the analysis of this event is the type of knowledge that Captain Sullenberger possesses that allowed him to recognize the problem, make a decision about how to solve it, and focus so intensely on the execution of his plan that he avoided what could have been a terrible tragedy for all the occupants of the aircraft.

The following is a transcript of the communications between the crew of US Airways Flight 1549 and the airport control tower, beginning 3 seconds before Sullenberger spots the birds approaching. Keep in mind that they are operating in a state of emergency in which just one mistake or wrong decision could be catastrophic. Notice how the interlocutors remain calm and focused. This is professional mastery.

15:27:07 Sullenberger: *After takeoff checklist complete.*

15:27:10.4 Sullenberger: *Birds.*

15:27:11 Skiles: *Whoa!* (this is First Officer Jeffrey B. Skiles who was the pilot during take-off)

15:27:11:4 (Sound of thump/thud(s), followed by shuddering sound.)

15:27:12 Skiles: *Oh. Shit!*

15:27:13 Sullenberger: *Oh yeah.* (Sound similar to the decrease in engine noise/frequency begins.)

15:27:14 Skiles: *Uh oh.*

15:27:15 Sullenberger: *We got one rol — both of 'em rolling back.*

15:27:18 (Rumbling sound begins and continues until approximately 15:28:08.)

15:27:18.5 Sullenberger: *Ignition, start.*

15:27:32.9 Sullenberger: *MAYDAY MAYDAY MAYDAY. Uh this is uh Cactus Fifteen-Thirty-Nine* [here Sullenberger gives the wrong flight number but this had no consequences] *hit birds, we've lost thrust (in/on) both engines we're turning back towards LaGuardia.*

15:27:42 LaGuardia Departure Control: *OK uh, you need to return to LaGuardia? Turn left heading of uh Two Two Zero.*

15:27:43 (sound similar to electrical noise from engine igniters begins.)

15:28:02 Skiles: *Airspeed optimum relight. Three hundred knots. We don't have that.*

15:28:03 Flight Warning Computer: Sound of a single chime.

15:28:05 Sullenberger: *We don't.*

15:28:05 LGA Departure Control: *Cactus Fifteen-Twenty-Nine* [sic]*, if we can get it for you do you want to try to land Runway One Three?*

15:28:05 Skiles: *If three nineteen. . .*

15:28:10.6 Sullenberger: *We're unable. We may end up in the Hudson.*

15:29:28 Sullenberger: *We're gonna be in the Hudson.*

15:29:33 LGA Departure Control: *I'm sorry say again Cactus?*

15:29:53 LGA Departure Control: *Cactus Fifteen-Forty-Nine radar contact is lost you also got Newark Airport off your two o'clock in about seven miles.*

15:29:55 Ground Proximity Warning System: PULL UP. PULL UP. PULL UP. PULL UP. PULL UP. PULL UP.

15:30:01 Skiles: *Got flaps out.*

15:30:03 Skiles: *Two hundred fifty feet in the air.*

15:30:04 Ground Proximity Warning System: TOO LOW. TERRAIN.

15:30:06 Ground Proximity Warning System: TOO LOW. GEAR.

15:30:06 Skiles: *Hundred and seventy knots.*

15:30:09 Skiles: *Got no power on either one? Try the other one.*

15:30:09 Radio from another flight: *Two One Zero uh Forty-Seven-Eighteen. I think he said he's going in the Hudson.*

15:30:15 Ground Proximity Warning System: CAUTION TERRAIN.

15:30:16 Skiles: *Hundred and fifty knots.*

15:30:17 Skiles: *Got flaps two, you want more?*

15:30:19 Sullenberger: *No let's stay at two.*

15:30:21 Sullenberger: *Got any ideas?*

15:30:22 LGA Departure Control: *Cactus Fifteen-Twenty-Nine if you can uh. . . you got uh Runway uh Two Nine available at Newark it'll be two o'clock and seven miles.*

15:30:23 Ground Proximity Warning System: CAUTION TERRAIN.

15:30:23 Skiles: *Actually not.*

15:30:24 Ground Proximity Warning System: TERRAIN TERRAIN. PULL UP. PULL UP. ("Pull Up" repeats until the end of the recording.)

15:30:38 Sullenberger: *We're gonna brace.* (Swops, B. 2009. 2018)

By the time of the landing on the Hudson, Chesley Sullenberger had accumulated close to 20,000 hours of flying experience. The highly experienced First Officer, 49 year-old Jeffrey Skiles accompanied him. Each of the three flight attendants also had more than 25 years on the job. The departure controller was Patrick Harten, a 35-year-old with just over 10 years of

experience at La Guardia Airport. Sullenberger learned to fly at age 16, and by 17 he had received his private pilot license in Texas. To this day he recalls the lessons that he learned from his pilot instructor and mentor L.T. Cook Jr. as being the key lessons that guided him throughout his flying career. Sullenberger recognizes that the training that enabled him to safely crash-land the Airbus A320 began decades before at the hands of Mr. Cook. Crucially, Sullenberger learned to be methodical in his learning years before he ever began flying. He recalls his father insisting that he emulate good craftsmanship and assume the attitude of *measuring twice and cutting once* (2009, p. 52).

Sullenberger began his career in the Air Force Academy in Colorado where he spent 25 years flying various types of aircraft. He never experienced combat, but he certainly accumulated thousands of flying hours. In 1980 he joined the private sector as a commercial pilot. Most pilots go their entire careers without experiencing engine failures. While the relative safety of modern commercial aviation is a great achievement, it can also become a hindrance as pilots are liable to become complacent and may lack preparation for situations such as the one Sullenberger and his crew faced. Flying airplanes is an incredible technological feat that keeps getting more and more sophisticated. The number of computers and systems that keep these massive machines consistently taking off, flying, and landing safely is mind-boggling and difficult to understand. Without these computers, we would not have the safe airline industry that we rely on, but at the same time, we can't forget the crucial role of the pilot and the crew. Airplanes might be an impressive technological success, but flying, particularly when technology fails, is an art and as such it requires expertise. Sullenberger had not only logged in the flying hours, but he was also a student of history and made a point of familiarizing himself with the actions taken by other pilots

who had performed emergency landings. Thus, he was able to learn from the experiences of other and become a true craftsman.

When recalling the event, Sullenberger remembers that after hitting the flock of geese the engines sounded like they were chewing themselves up inside. He noted that that these noises were unnatural and that the engines "sounded and felt BAD" (2009, p.209). Then he was also able to smell the "distinct odor (of) burning birds" (2009, p.209). In those first seconds, Sullenberger did not have time to think nor to analyze. He grasped the seriousness of the situation through his sense perception, and took action. He knew immediately that this was a situation like none other he had ever experienced and that he had only minutes, at best, to try to save everyone onboard. The controller from LaGuardia was doing the best he could and provided what appeared to be logical solutions for an emergency landing, but Sullenberger knew instinctively, in other words he 'felt' that those were not viable options. Honed over more than 40 years of flying, his gut feeling told him that the best chance of survival was to land on the Hudson River. Sullenberger's intense focus was vital to accomplishing this feat. He could not allow any outside thoughts, including thoughts about his family, or distractions, from noises or messages from the airport controller, to interfere with the maneuver he was about to attempt. As the plane descended and approached the water, the computer warning systems blared. Red lights flashed, chimes sounded repetitively, and proximity warnings shrieked at the pilots, but Sullenberger and Skiles did not panic. They knew, consciously or subconsciously, that they had a job to do and they executed it perfectly. Sullenberger and Skiles had learned to pay close attention to what is truly important in flying situations years before they were obliged to use those skills. Several news media reported that Peter Goelz, a former National Transportation

Safety Board director, called this complicated maneuvering an "amazing piece of airmanship."[1]

The perfect execution of the landing on the Hudson during the afternoon of January 15, 2009 was the result of years of personal knowledge accumulation. Sullenberger summarizes his experience beautifully by saying:

> *"Flight 1549 wasn't just a five-minute journey.*
> *My entire life led me safely to that river."* (C. Sullenberger III, 2009, p.16. Emphasis mine)

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[1] This statement was reported by CNN. http://edition.cnn.com/2009/US/01/16/crash.pilot.profile/
ABC News. https://mobile.abc.net.au/news/2009-01-16/pilot-hailed-hero-of-the-hudson-after-ny-plane/268440?pfmredir=sm&pfm=sm
The Sidney Morning Hearald. https://mobile.abc.net.au/news/2009-01-16/pilot-hailed-hero-of-the-hudson-after-ny-plane/268440?pfmredir=sm&pfm=sm.

Introduction

"If habit is neither a form of knowledge nor an involuntary action, what then is it? It is knowledge in the hands, which is forthcoming only when bodily effort is made, and cannot be formulated in detachment from that effort."

Merleau-Ponty. Phenomenology of perception. (1962, 2002, p. 166)
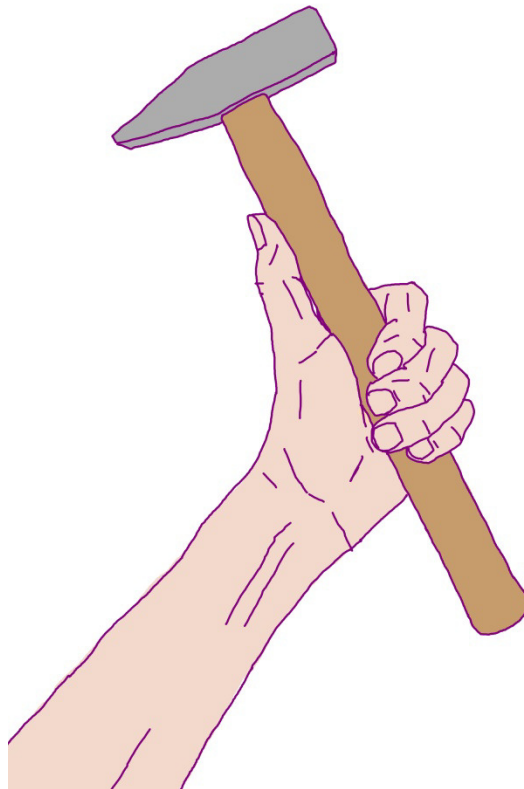
Alejandro Salas-Strus. 2018

INTRODUCTION

"What could be more difficult to know than to know how we know?"

Antonio Damasio (1999, p. 4)

In upcoming years many institutions in the private and public sectors will lose valuable organizational knowledge due to retirements and attrition, and this can potentially have a crippling effect on their organizational effectiveness and ability to deliver services. Institutions are constantly changing through restructuring and consolidation, but strikingly high churn is an emerging trend in the new 'knowledge economy'[2] – where employees do not remain in the same job for long periods of time. In this context, organizations are in constant need to generate new knowledge to stay competitive while at the same time preserving the information and knowledge held by their employees[3]. They need to have processes and tools that allow them to capture employees' *know-how-and-know-what*, and disseminate that information and knowledge to other employees within their organizations.

Ian Angus points out that "we live in a knowledge society and there is no doubt that contemporary society is deeply committed to the extension of knowledge and its rapid utilization in innovation" (2009, p. 13). It is this process of trying to create new knowledge and innovate

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[2] The term 'knowledge economy' was coined by Peter Drucker in 1969 and it refers to the application of knowledge from any field to spur economic development. The hypothesis is that 'knowledge' has replaced land, labour, and capital as the most important factor in production. In the year 2000, Manual Castells extended the idea of the knowledge economy to what he called the 'information economy.' Over the last twenty years, the idea that our society is driven by knowledge, mostly theoretical scientific knowledge, has resulted in policymakers at the national and international level, such as the European Union and the World Bank, writing policies to encourage nations to implement educational strategies around STEM (science, technology, engineering, mathematics) subjects. The World Bank published in 2008 a position paper called Knowledge for Development: Knowledge Assessment Methodology to supposedly help nations determine their readiness to participate in the knowledge economy.

[3] Fox. D. Statistics Canada. *Federal Public Service Retirement: Trends in the New Millennium.* http://www.statcan.gc.ca/pub/11-621-m/11-621-m2008068-eng.htm accessed on May 31, 2013.

faster than new competitors which has proven to be fatal for many businesses over the last two decades. We have witnessed well-known companies, from different industry sectors, disappear because they failed to adapt to the new realities of the information economy. Companies like Blockbuster, Sears, Radio Shack, Pan Am Airlines, Oldsmobile, Netscape, and Borders are just a few examples of the casualties of the new economic system.

With all of this said, we might be tempted to assume then that the solution for knowledge creation and knowledge transfer is to add more technological training in schools and at work to better prepare our current and future workforce. The message coming from governments and the private sector is that students and workers need to continually learn new scientific and technical skills to survive in the digital economy. There is a push to move away from the foundational training of the humanities in favor of training in STEM fields.[4] Governments invest billions of dollars in buying computer equipment for schools, while at the same time reducing the budgets for humanities and art-related programs.[5] The assumption is that science and technology are the

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[4] STEM – Science, Technology, Engineering, and Mathematics In the United States in 2013 in an address by President Barack Obama regarding educational reform, he stated: *"One of the things that I've been focused on as President is how we create an all-hands-on deck approach to science, technology, engineering, and math. … We need to make this a priority, to train an army of new teachers in these subject areas, and to make sure that all of us, as a country, are lifting up these subjects for the respect they deserve."* Source: https://obamawhitehouse.archives.gov/issues/education/k-12/educate-innovate

For the government of Ireland STEM is also of huge importance. From the Ministry of Education Website: "The promotion of **STEM learning** within our education system is a key **priority** for the Department and is reflected in multiple strategy documents". https://www.education.ie/en/The-Education-System/STEM-Education-Policy/stem-education-policy-statement-2017-2026-.pdf

Ed Holder, A Conservative Minister of Science and Technology stated in 2014: "Today, science, technology and innovation drive the prosperity of nations. Canada has great strengths in this regard. Our Government, has made record investments in science, technology and innovation to push the boundaries of knowledge, create jobs and opportunities, and improve the quality of life of Canadians.*"* https://www.ic.gc.ca/eic/site/icgc.nsf/eng/h_07472.html

[5] A study conducted by José Aróstegui concludes that the decline in music education worldwide is due to the following factors: (1) the model of curriculum supported in educational reforms; (2) an emphasis on standardized evaluation; (3) less resources available; and (4) a wrong approach to music advocacy. ERIC

only fields worthy of substantial investment at the elementary and high-school levels. Parents panic with every report that shows that their districts do not score as well as Korea or China in mathematics, leading them to demand that school curriculums place even more emphasis on math and the sciences. Universities have not fared any better, and we continue to see the trend towards the corporatization of colleges and universities. For Jamie Brownlee (2015), the corporatization of higher education institutions is a process through which the university evolves to serve the private marketplace. Hence, the uses and benefits of university resources and knowledge production are being handed over to private interests at the public's expense. Under a corporate-driven education system, there is no differentiation between the public and private interest, and the only knowledge worth pursuing is science-driven knowledge with a clear consumer application and market value. A focus on STEM training, although well-intentioned, is an attempt to build technical capacity, but unwittingly fails to equip students to become self-learners or explorers. Without humanities training, learners risk becoming mere technicians, who cannot bring innovation to their craft. American philosopher Martha Nussbaum (2012), known for her work on a 'Human Development Capabilities Model', argues that "you cannot get innovation without cultivating the imagination," (WISE Channel, 2012, 0:47) and that the best way to cultivate creativity is through a liberal arts-based education system. For Nussbaum, schools are preparing people not just for jobs but to be engaged citizens, and to have the

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Journal. *Exploring the Global Decline of Music Education. Arts Education Policy Review*, v117 n2 p96-103 2016.

      The Association of American Educators reported that art programs, including visual arts, music, theater, and dance are on the decline mostly due to budget constraints. https://www.aaeteachers.org/index.php/blog/700-report-art-education-programs-on-the-decline

      The Association of Colleges and Universities Canada reported in 2017 enrollment in Liberal Arts programs continue to decline due to a mistaken narrative that graduates from these programs are not job-ready. https://www.univcan.ca/the-future-of-the-liberal-arts-report/

opportunity to live meaningful lives. Education, she argues, must be infused by voices from the arts, by voices from the humanities, so that students do not become mere instruments for short-term economic profits (WISE Channel, 2012, 0:51 and 3:25).

I have selected the title 'Reclaiming Craftsmanship' for this dissertation in order to advocate for the return to the spirit of craftsmanship. It is important for individuals to take the time to learn and develop the skills necessary to achieve a high degree of proficiency in their practice(s). Regardless what the practice might be (whether it is that of a medical doctor, a marketing manager, a computer programmer, a teacher, a nurse, a tradesperson, a factory worker, an artist, a company executive, or a government bureaucrat) we can all benefit from the craftsman's desire to feel proud of a job well done in and of itself and not just for financial gains. Organizations would benefit from the desire to constantly improve the quality of a product or a service, and not just settle for something inferior for the sake of getting by. We could benefit from the desire to be curious about ambiguity and possibility, and embrace successes and failures as opportunities to continue to hone skills. Craftsmanship, Richard Sennett (2008) explains, is about being engaged in the pursuit of mastering a practice. The Craftsman, he writes, explores the dimensions of skills, commitment, and judgment by focusing "on the intimate connections between hand and head. Every good craftsman conducts a dialogue between concrete practices and thinking; this dialogue evolves into sustaining habits" (p. 9), and these habits help the craftsman develop the intuition to be able to recognize and solve problems and challenges. The development of skills and habits depend on taking the time to repeat actions, again and again, to be able to find the rhythm to learn and overcome challenges, recognize new problems—which then need to be solved—and start the learning cycle again. For a craftsman, doing, thinking, and feeling are intertwined in the process of developing skills and knowledge. The operation is as

important as the result. Sennett is concerned that modern technology, when abused, deprives the user of the opportunity of repetitive hands-on training that is crucial for the development of any skill. Western society focuses on results while ignoring the value of understanding the operation and this is not conducive to the development of craftsmanship skills.

The spirit of craftsmanship also speaks of knowledge sharing. It is a commitment to pass the knowledge and skills to others in the community. However, when we have a society that thrives on competition, and organizations that compare employee performance and reward individuals for doing better than their colleagues, we should expect employees to hoard information and to do only the tasks that will give them personal advantage regardless of the consequences for the overall organization or society. Craftsmanship, of course, is not a panacea for the difficulties of sharing and transferring personal knowledge. What I am attempting to reclaim is the idea of working with others, particularly skillful individuals, in a spirit of cooperation and skill improvement that is essential for knowledge transfer. A craftsmanship development approach involves constant observation and practice to be able to learn from the thousands of unspoken rules and indescribable actions of a skilled craftsman. It is the willingness to acquire mastery step by step, and it is the kind of learning that builds up over time until the learner also becomes a craftsman.

Trying to understand what knowledge is, how we come to possess it, and what we mean when we say 'this person is knowledgeable' has been the concern for philosophers and scientists for centuries. Greek philosophers such as Socrates, Plato, Aristotle, and Euclid were among the first to formulate a theory of knowledge. This theory, known as Rationalism, proposes that knowledge is derived primarily from logical reasoning without necessarily having empirical

observations.[6] Rationalism has had an enormous influence in mathematics and more recently in artificial intelligence. A different idea of knowledge was presented in the seventeenth-century by René Descartes who defined knowledge in terms of doubt.[7] For him, the only certainty was the existence of the doubting mind. Another well-known theory of knowledge is Empiricism formulated by Bacon and Hobbes and later taken up by Locke and Hume, among others. It argues that knowledge is derived from empirical observation and inductive reasoning. Empiricists challenged the rationalist doctrine which denied experience and empirical facts as integral to what we count as knowledge. In the eighteenth-century, Kant synthetized rationalism and early empiricism by utilizing cognition alongside experience—known as transcendental idealism—to tackle the dilemmas of knowledge acquisition. The debate about theories of knowledge has continued in the last two centuries. Today we find studies of knowledge that incorporate contributions from linguistics, computer science, psychology, and neuroscience, among other disciplines.[8] My focus is on personal knowledge and questions about acquiring it and sharing it.

The first chapter of this book explores a brief history of the concept of knowledge with an emphasis on 'personal knowledge'. Borrowing the idea from psychologist James Gibson, I use an ecological approach to personal knowledge by encompassing the environment and the entire human body, with all its senses, as a medium for experience and as a source of mental action in

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[6] For example, Plato's analysis of knowledge states that there are three components of knowledge: belief, truth, and justification (Marcos, 2010).

[7] Descartes's methodical doubt, writes Burke, "set the ground rules for a system of intellectual analysis that would render more reliable the discoveries of thought, prescribing as it did a systematic process for thinking things through" (1999, p. 134).

[8] Elinor Ostrom (2011), a scholar in Political Economy and a Nobel laureate in Economics, refers to 'knowledge' as all intelligible ideas, information, and data in whatever form they are expressed or obtained. She writes that knowledge is "all types of understandings that might come from experience or study whether indigenous, scientific, scholarly or otherwise non-academic" (2011, p.8).

the acquisition of knowledge. I argue that personal knowledge doesn't happen inside our brains only, but it is found in the interactions of the body with the environment, including the physical, the social, and the cultural.

When you walk on any street, go to a restaurant, attend a music event, or walk down the hall in an office building it is quite common to find many people so engrossed by their mobile devices that they ignore everything around them. We are choosing to live more inside our digital and virtual worlds while avoiding the actual world. Sheri Turkle (2011) summarizes her book *Alone Together* by stating that "we expect more from technology and less from each other. This put us at the still center of a perfect storm. Overwhelmed, we have been drawn to connections that seem low risk and always at hand" (p.120). If we get accustomed to living with virtual companions, it might become challenging for us to handle the demands of people in real communities. Chapter II addresses the need to reclaim human-to-human connection and conversation in a time where chat-bots and robots are increasingly becoming part of everyday interactions.

In Chapter III, I explore learning in an environment full of technological distractions, the need to expand the scope of literacy to include multiple modes of representation, and the impact of copyright laws on the free flow of information and knowledge sharing.

The journey continues in Chapter IV where I examine the idea of reclaiming time in a world obsessed with speed and convenience. We all share, to one degree or another, the tendency to ignore having to plan or even think about events that might occur in the future. It appears to be harder for us to make decisions and take pre-emptive actions that could benefit us over the long-term, and instead, we generally prefer to make decisions that deal only with immediate priorities and concerns. While the fascination with fast and immediate gratification might result in short-

term satisfaction, the achievement of any type of expertise requires long periods of learning, and practice to be able to build and accumulate personal knowledge. In this chapter, I discuss the negative impact of pervasive short-term thinking[9] that has become the norm for both organizations and individuals.[10] I also explore the idea popularized by Daniel Levitin and Malcolm Gladwell, that it takes ten thousand hours of deliberate practice/learning[11] for an individual to become an expert in a field. This idea, of course, is irreconcilable with the obsession of achieving results in a short period of time with minimal effort. From my perspective, the actual number of hours required for "greatness," as Gladwell calls it (2011, p. 41), is not as important as recognizing that the process of in-depth learning is as lengthy as it is difficult. Kahneman, a Nobel laureate in Economics, points out that using our brain to engage in deep thinking and reasoning takes time and is exhausting, but it is precisely this hard-work that pays off in the quest to develop craftsman-like expertise.

After exploring learning and the acquisition of personal knowledge, in the following chapter I move on to examine ideas about how to share personal knowledge in our workplaces and communities. Online education and mentoring might provide the opportunities to develop personal learning environments and build communities of practice, allowing us to decide when, what, and how we want to learn and with whom we want to collaborate. However, knowledge collaboration and creation should not be viewed as a technical challenge requiring a

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[9] Short-term thinking is also known as short-termism or 'quarterly capitalism.' (Martin, Roger L., 2015, October 9).

[10] For behavioral economist Paul Roberts, extreme consumerism, with the assistance of technology and marketing strategies which cater to every desire, drives our obsession with immediate gratification. (2014).

[11] Gladwell used Anders Ericsson research to talk-about the 10,000 hour rule. However, Ericsson contends that it is not just the quantity of hours that are important but also how an individual practices. Ericsson coined the term 'deliberate practice' (Ericsson, 2016).

technological solution. As Arnold Pacey (1991) asserts, "to hope for a technical fix for any challenge in society that does not also involve social and cultural measures is to pursue an illusion" (p.10). Far from being technical problems, the acquisition and sharing of knowledge are personal, social, and cultural endeavors. Chapter V deals with innovation, mentoring, and a software application designed to facilitate the communication and repository of documents for communities of practice.[12] Appendix A explains the research and methodology behind this dissertation.

Throughout all the chapters, I have included excerpts and observations from research interviews that I conducted with thirteen individuals from various industries and organizations. These interviews were conversations about the role of experience and mentoring in the development of their personal expertise. I am using numbers (for example, interviewee-one) and he or she without a direct link to gender to keep the identity of the participants confidential.

I conclude this dissertation with some final remarks and observations. This journey has opened many doors that I look forward to exploring in the future, and fortunately or unfortunately, has given me more questions than answers as I pursue the task of understanding how people acquire personal knowledge and how we can best share that knowledge.

As part of my dissertation, I also built an *Alphabet of Personal Knowledge* to explore the etymology of words associated with learning and the concepts of such words in relation to learning and personal knowledge.[13] This investigation highlighted the many elements that are involved in learning and developing expertise. The process of acquiring personal knowledge is very complex. Each one of the words/concepts discussed in the Alphabet of Personal Knowledge is the subject of study for many scholars and each is worthy of in-depth exploration and analysis.

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[12] For more information, see: http://www.endere.org
[13] Please see: http://www.endere.org/alphabet.aspx
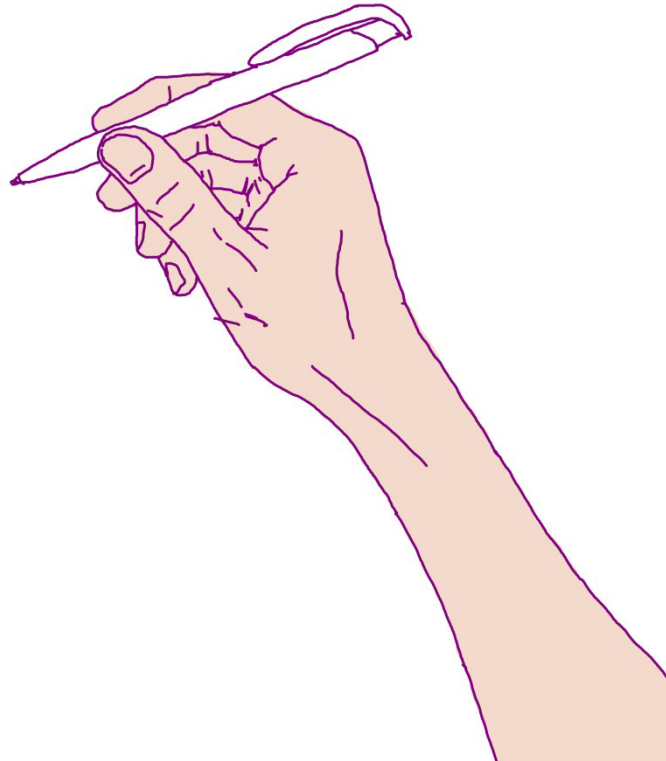
A Brief History of Knowledge

A Brief History of Knowledge

All these psychics and these doctors
They're all right yet they're all wrong
It's like trying to make out every word
When they should simply hum along

It's not some message written in the dark
Or some truth that no one's seen
It's a little bit of everything.

A Little Bit of Everything by Dawes

My exploration into personal knowledge is not intended to be a comprehensive historical or in-depth analytical review of 'knowledge', but only to touch on those aspects that are relevant to my core investigation about how people acquire personal knowledge and how people can share it. The journey that I am taking is fundamentally centered on the embodiment[14] of knowledge and experience. What I mean by this is that it encompasses the human body as source or medium for experience, and therefore for the acquisition of knowledge (cognition). Merleau-Ponty grounded his understanding of knowledge in the experienced body, and he explains it this way:

> "All my knowledge of the world, even my scientific knowledge, is gained from my
> particular point of view, or from some experience of the world without which the
> symbols of science would be meaningless. The whole universe of science is built upon
> the world as directly experienced, and if we want to subject science itself to rigorous
> scrutiny and arrive at a precise assessment of its meaning and scope, we must begin by
> reawakening the basic experience of the world of which science is the second-order

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[14] Embodied cognition is fully dependent upon the entire physical body of the individual and not only the brain. Embodied cognition is sometimes referred to as interiorization or indwelling. For Polanyi (1962) knowing is an activity that the body embarks on and whose result is discovery and understanding. For Polanyi knowledge is the act of knowing.

expression. Science has not and never will have, by its nature, the same significance qua form of being as the world which we perceive, for the simple reason that it is a determination or explanation of that world." (1962, p. IX)

Since Descartes separated the mind from the body in 1641, Western philosophy has grappled with the relationship between the two, uncertain about how much influence, if any, the body has on the workings of the mind. It is not that Western philosophy entirely denies the relationship between mind and body, so much as willfully ignoring it because it is not readily measurable; and consequently it resists lending itself easily to mathematical, chemical, or biological explanations. Hence, quantitative measures are not yet able to grasp the full depths of cognition and its functioning. The lack of recognition for the body as the master has resulted in a society where we place more value on cerebral tasks than on physical tasks.[15] The individuals that we consider to be knowledge workers typically earn higher salaries than manual workers. Nevertheless, reflection and experience reveal that the body-mind relationship is intricate and inseparable (without a body there is no mind), therefore we cannot properly examine knowledge without considering the role the body plays in cognition. Phenomenologists and now cognitive scientists have begun to speak of embodied cognition and recognize that the mind is not the only source of control and cognition. As we increasingly make advances in science and particularly in artificial intelligence, and as we continue to replace human jobs with robots and algorithms, I believe it is essential to review what we mean by 'personal knowledge' and decide whether or not we deem it worthy of acquiring and sharing. This is by no means a rejection of science, but only of the idea that modern science has a monopoly on the creation of valuable knowledge.

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[15] Craftsmanship experienced a significant decline during the industrial revolution when machines began to replace many jobs that were previously performed by craftsmen.

The word 'knowledge' is a part of our everyday speech which also carries with it a long history of philosophical inquiry. To this day, knowledge as a concept eludes a general and accepted definition, despite the concerted efforts of many philosophers and scholars. As a result, there have been many 'theories of knowledge' developed by Greek, Renaissance, Classical, modern, and post-modern philosophers, attempting to define how knowledge is derived, and what it constitutes. The word itself has its origins in the early twelfth-century. The first part "*know*" is derived from *cnawlece* which is associated with the acknowledgment of a superior, honor, or worship. The second part "*lock*" might have Scandinavian roots, and is related to action and process. By the late fourteenth-century it was used to describe an organized body of facts or teachings, and it was also used as a verb, *knoulechen,* to mean "acknowledge."[16] The history of the word 'knowledge' tells a story of recognition; recognizing authority and recognizing the wisdom in another's ideas. To gain knowledge is to recognize and to understand. There are also a significant number of adjectives that are frequently associated with knowledge such as: rational, empirical, deep, superficial, theoretical, practical, useful, working, public, private, scientific, factual, tacit, explicit, general, specialized, and innate. More recently we even hear that we have entered "the knowledge worker age" or 'knowledge economy' (Drucker, 1969, p. 264), and that with the advent of web 2.0 tools we are moving from self-knowledge to collective-intelligence[17] (Levy, 1999; Jenkins, 2006). Greek philosophers such as Socrates, Plato, Aristotle, and Euclid were among the first to formulate a theory of knowledge. This theory, known as 'Rationalism,' proposes that knowledge is derived primarily from logical reasoning without necessarily having

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[16] Knowledge (n). In *Online Etymology Dictionary.* Douglas Harper. Retrieved on Oct. 26, 2013 from: http://www.etymonline.com/index.php?term=knowledge&allowed_in_frame=0.
[17] The term 'collective-intelligence' refers to when people interact with each other using mostly shared digital artifacts. The premise is that it shifts the knowledge from the individual to the collective.

empirical observations. For example, the analysis of knowledge found in Plato's dialogue

Theaetetus states that there are three components of knowledge: belief, truth, and justification,[18]

and that these three elements are individually necessary and together provide a sufficient basis

for knowledge. Aristotle attempted to codify thinking by using syllogisms that provide a pattern

for argument structures which always resulted, according to his logic, in correct conclusions.

Rationalism has had an enormous influence on mathematics and made artificial intelligence

plausible by supposing that the mind is in some ways similar to a machine. Mathematics

provides the tools to create and manipulate logical statements which set the groundwork for the

development of algorithms, and in turn, algorithms can be used to emulate thinking.

A different idea of knowledge was presented in the seventeenth-century by

René Descartes, who defined knowledge in terms of doubt. His methodical doubt, writes Burke,

"set the ground rules for a system of intellectual analysis that would render more reliable the

discoveries of thought, prescribing as it did a systematic process for thinking things through"

(1999, p.134). For Descartes, the only certainty was the existence of the doubting mind. Another

well-known theory of knowledge is 'Empiricism' formulated by Bacon and Hobbes, and later by

Locke and Hume, among others. It argues that knowledge is derived from empirical observation

and inductive reasoning. Empiricists challenged the Rationalist doctrine which denied experience

and sensual observation as integral to what we count as knowledge. In the eighteenth-century,

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[18] In Plato's analysis nobody knows anything without believing in it. Furthermore, we would not say there is knowledge in a 'belief' if it is not true. And lastly, knowledge depends on its justification (Marcos, 2010).

The Stanford Encyclopedia of Philosophy explains the tripartite analysis of knowledge—truth, belief, and justification—as follows: "*S* knows that *p* if and only if *p* is true and *S* is justified in believing that *p*."

Epistemology. (2016) In *Stanford Encyclopedia of Philosophy*. The Metaphysics Research Lab, Centre for the Study of Language and Information (CSLI), Stanford University. Retrieved from: https://plato.stanford.edu/entries/epistemology/

Kant synthesized rationalism and early empiricism by utilizing cognition alongside experience, known as 'transcendental idealism,' to tackle the dilemmas of knowledge acquisition. In his book *Critique of Pure Reason,* Kant disagrees with Locke, arguing that the act of cognition is not passive, but active. Moreover, he argued that we do not merely make a list of the things we see, but we consciously or unconsciously attempt to understand the information provided by our senses. For Kant, some of our knowledge is also inborn, namely, the knowledge of space and time.

The debate about theories of knowledge has continued throughout the twentieth and into the current century. Today we find studies of knowledge that bring contributions from linguistics, computer science, psychology, and neuroscience, among other disciplines. Elinor Ostrom,[19] a scholar in political economy and a Nobel laureate in Economics, refers to 'knowledge' as all intelligible ideas and information in whatever form they are expressed or obtained. She writes that knowledge is "all types of understandings that might come from experience or study whether indigenous, scientific, scholarly or otherwise non-academic" (Ostrom, 2011, p. 8). For Ostrom, the key to knowledge is the understanding of ideas and information, whereas for David De Long, knowledge comes from combining information with human context, which in turn "enhances the capacity for action" (De Long, 1997, p. 5).

Many of the topics around knowledge such as aptitude, perception, thinking, learning, memories, emotions, and intelligence have been investigated extensively by academics as well as industry consultants. However, the research on tacit and personal knowledge is more recent[20] and

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[19] Elinor Ostrom is known for her research and analysis on the management and governance of the commons. For Ostrom the commons include all natural resources as well as intellectual resources.

[20] The term tacit knowledge is widely attributed to Michael Polanyi after the publication of his book *Personal Knowledge* (1962).

requires further attention from various disciplines due to its complexity. What constitutes tacit knowledge and how valuable it is for individuals and organizations remains to be fully understood. Furthermore, it calls for a holistic analysis capable of integrating multiple perspectives and not just confined to one field such as knowledge management or artificial intelligence.

I start from the premise that we live in a world of experiences in which the lived is always greater than the personal knowns (Merleau-Ponty, 1945-1962-English version) and that our written and oral language is incapable of expressing or comprehensively documenting the totality of our knowledge. As Michael Polanyi wrote "*we can know more than we can tell*" (1962, p. 4. emphasis in original). Furthermore, I maintain that human thought is determined not only by the characteristics of the body but, by the social context within which thought and learning arises. In other words, the foundation of human thought is human activity with all its unlimited complex relations, tools, and technologies. Mind, body, and the world are constantly interacting. Experiences and processes cannot merely be rendered into words and follow language rules, because language, even with all its symbols, cannot fully express the experiences of the body in the world.

Currently, most of the literature concerning the concept of knowledge comes from the foundations of positivist epistemology.[21] The definition of knowledge, until the early twentieth-century, was mostly restricted to only those ideas that could be tested by empirical methods. During the last several decades there has been an effort to redefine knowledge by emphasizing the personal aspect of knowledge based on human experience. Today, the most common

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[21] Positivist epistemology or Positivism refers to a school of thought that assumes that only observable evidence and/or facts that are the result of scientific methods and experimentation should be considered knowledge.

definition of the term posits two types of knowledge: explicit and tacit. This view is often quoted by authors of knowledge management systems, and intellectual capital analysts in the private sector have embraced it and adopted it (Davenport & Prusak, 1998; Nonaka & Takeuchi, 1995). Explicit knowledge is described as knowledge that can be articulated and therefore transmitted, while tacit knowledge, on the other hand, is hard to articulate and therefore is more difficult to transmit. Furthermore, Michael Polanyi's argues that because of its personal nature, tacit knowledge could neither be objective nor fully justified. For him, personal knowledge is reliable without being static and impersonal. Mary C. Richards, a poet and educator, maintains that each of us has different modes of knowing. The challenge, she points out, is that society is always demanding proof, justification, and demonstrability in order to assign a higher degree of importance to that type of knowledge, thus minimizing the value of intuition (1989, p.109). For Richards there is more than just explicit, justifiable knowledge, and that we do a disservice to ourselves when we accept the idea that knowledge can exist independently of humans.

The concept of tacit knowledge has been widely and diversely adopted in academic and knowledge management literature thanks to Michael Polanyi's seminal work, *"Personal Knowledge"* (1958, 1962). Tacit knowledge is typically associated with knowledge which cannot be articulated; the kind that a person has but might not even be aware of possessing. Polanyi's central thesis argues that acts of discovery and the acquisition of new knowledge are the outcomes of not just new information and observation, but the combination of such information with strong personal feelings and commitments, hence the title of his book. Polanyi convincingly argues against the dominant idea, particularly in natural science, that knowledge is value-free and that every kind of knowledge can be at some point in time codified and documented in conformity with certain rules and processes. This includes some of the knowledge that we might

have classified as tacit, such as driving a car, or playing a musical instrument, or evaluating a student essay. Proponents of artificial intelligence argue that software programs will one day be able to do most human tasks, however, like Polanyi, Richard Sennett emphasizes that playing a musical instrument, for example, it is not just about technique, but about personal interpretation of the music, and because it is personal it cannot be codified. Polanyi and Sennett contend that the vast majority of human activity is a highly complex interaction of the body and the mind, and it is this unique body-mind relationship that reaffirms the concept of tacit knowledge.

For Polanyi, guesses, intuition, gut feelings, etc. are all personal "passions" aimed at pursuing new ideas and discoveries, and these passions are not something that can be stated in propositional terms. If we are to view tacit knowledge as personal knowledge, then we must accept that this type of knowledge comprises data, information, and a range of conceptual and sensory information that is always brought to bear by the person who is attempting to make sense of it. By paying attention to this dimension of knowledge, we can then begin to make sense of the place of intuition and feelings in our personal processes, as we pursue the acquisition of new knowledge. Tacit knowledge cannot be simply taught by memorizing rules, but rather is a personal undertaking that requires some type of sensory experience. For this reason, written language, and even speech for that matter, are deficient conduits for the adequate communicability of tacit knowledge.

From my perspective, personal knowledge is the knowledge that a person has acquired and appropriated based on her bodily experience and her personal context –social and cultural. This knowledge is unique to the individual and each has her own unique tacit knowledge. The critical point is that we all have our own tacit knowledge. We might share the same explicit knowledge, we might even share very complex explicit knowledge, but it is that individual

bodily experience and context that makes the knowledge 'personal' for each of us, as M.C. Richards so beautifully wrote: "To know means to *unite with in the flesh*. Having beheld the world in its ultimate physics, one will have beheld Wisdom. It is by one's warmth that one takes into oneself" (1989. p 132. emphasis in original). We are full of unique understandings despite the pressures towards valuing only explicit, measurable knowledge. The acquisition of personal knowledge is about making connections and putting pieces of information together in a manner that makes sense to us individually. It is an active process of interaction with our environment, mind, and body. It is an act that we do by ourselves, for ourselves, purposively and cognitively. Polanyi describes the process of acquiring tacit knowing by interiorizing or indwelling as follows:

> "We may say that when we learn to use language, or a probe, or a tool, and thus make ourselves aware of these things as we are our body, we *interiorize* these things and *make ourselves dwell in them*. Such extensions of ourselves develop new faculties in us; our whole education operates in this way; as each of us interiorizes our cultural heritage, he grows into a person seeing the world and experiencing life in terms of this outlook."
> (1969, p. 148. Emphasis in original)

I enjoy cycling. I have a vague memory of how I learned to ride a bicycle. I believe it was my older brother that taught me how to ride. I do not remember how many times I fell or how many scrapes and laughs from my brother and his friends I had to endure before I became a confident rider. What I do remember vividly is the feeling of freedom I experienced while riding through the dirt roads of my old city on my red bike. Later, as a teenager, I learned to ride a road bike and with the school cycling club, I learned how to climb hills and how to position my body for fast descents. I grew up in a city located in the Andes at an altitude of 2,700 meters with lots of steep hills and mountains. I learned how to manage climbs and descents by observing the more experienced cyclists and by repetitive imitation of their movements until I embodied those

movements. I am not by any measure a good cyclist, but I do enjoy cycling and I own three different bikes. I have a foldable bike for the city that has become my favorite for its easy maneuvering and for getting in and out of traffic with minimal challenge. I use my road bike for the long and fast rides on country roads and my tri-bike for triathlon races. Riding these different bikes might require similar body balancing principles of 'riding a bike', but to me each bike is different, and the position of my body is different on each machine, which in turn determines how I experience the world while riding. The knowledge that I have on how to handle each bike and maximize performance out of each one of them is unique to the individual cycle. Polanyi understood the crucial role of the body in the shaping of our interaction with the world. He explains embodiment this way: "Every time we make sense of the world, we rely on our tacit knowledge of impacts made by the world on our body and the complex responses of our body to these impacts. Such is the exceptional position of our body in the universe" (1969, p. 147).

For pragmatist philosophers, experience and intuition play a key role in the acquisition of knowledge. John Dewey argued that experience is the most fundamental way a person acquires knowledge. 'Experience' becomes a moving force that can arouse curiosity, strengthen initiative, and kindle passion for continued engagement in learning activities (1938). Hubert Dreyfus, another pragmatist who is a passionate advocate of tacit knowledge, argues that knowledge can't be found following Cartesian rationalism and that the idea that knowledge can be programmed in a computer is fundamentally flawed. Jean-Claude Carriere, as reported by Tonnac (2012) brings Dewey's and Dreyfus' ideas together by stating that "learning is what we are burdened with, and which may not always be useful to us" (2012, p. 76-77). He equates learning with the acquisition of information and goes on to explain that knowledge, on the other hand, "is the transformation of that learning into a life experience" (p.77). Therefore, Carriere suggests, we should let

machines collect information while we focus "our energy on knowledge" (p. 77). In other words, mental activities such as perception, reasoning, and particularly intuition are not suitable for information processing since these activities are deeply personal and essential for personal knowledge acquisition.

At one point or another in our lives, we look back and reflect that some of the knowledge that we were supposed to acquire during our schooling is nowhere to be found in our memory and question the value of that period of learning. The problem, for Dewey, is that those subjects were learned in isolation with the only goal of passing an exam and so were not linked to valuable and practical experiences. Knud Illeris (2005) builds on the idea that experience is required for proper learning and puts forward a method for understanding learning that involves external interaction between the learner and her social, cultural and material environments, and internal psychological processes of elaboration and acquisition. For Illeris the "endeavour of the learner is to construct *meaning* and *ability* to deal with the challenges of practical life and thereby an overall personal *functionality* is developed" (2005, p.10. Emphasis in original). Interviewee-nine recalls how some of his teachers were very influential during his educational journey. He remembers one teacher in particular who was able to connect and link ideas from the classroom to the outside world. This made the experience of learning exciting, he recalls. By means of experience, an individual not only acquires knowledge and skills but also many other things such as opinions, insights, habits, methods, strategies, etc. that contribute to building up the capacity of the same learner to acquire more knowledge and skills.

In the 1970's, Dreyfus developed an interesting model to explain how people acquire skills and increase their level of knowledge and expertise. This five-stage model[22] begins with

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[22]Later, Dreyfus extended his model to seven stages: 1) Novice, 2) Advanced Beginner, 3) Competence, 4) Proficiency, 5) Expertise, 6) Mastery, and 7) Practical Wisdom (2001).

Novice (the person has little or no previous experience and needs specific rules and procedures to follow), then *Advanced Beginner* (the person starts to break away from fixed rules and starts to experiment). The third stage is *Competent* (in this stage practitioners have acquired a good grasp on their domain and are able to solve problems); the fourth stage is *Proficient* (the person seeks out and understands the broader implications and connections in their field). The final stage is referred to as *Expert* (the person is considered a source for knowledge creation). For Dreyfus, it is the vast accumulation of experience that an expert has available to them when solving problems that allows experiential knowledge to become intuition. When a person becomes an expert, she can then focus on 'end goals' rather than 'means to get there.' In other words, the know-how and intuition take care of the process without requiring explicit thinking. After studying the role of learning, practice, and experience, psychologist Herbert Simon (as described by Kahneman) concludes that "intuition is nothing more and nothing less than recognition" (2011. p.237). Intuition arises when an expert's know-how has been integrated via the body. What allows the expert to keep her focus on the end goals is the body that knows how to act. Dreyfus (1986) argues for embodiment by explaining that experts always have a 'feel' of whether they are on track as they work. Sennett (2008) also argues that the result of continuous learning and practice is the conversion of information and practice into tacit knowledge that becomes so natural to us that we hardly notice it. The development of expertise is the development of a 'feeling' of the expected operation of a process so that the body can remain alert to occurrences that are out of the ordinary. Invariably the acquisition of knowledge and the development of expertise involve working with others, learning from others, and using tools. McLuhan, Merleu-Ponty, Polanyi, Ihde, and others have argued that tools become extensions of

the body to the point that our sensory capacities are extended by these tools.[23] We come to feel

and know things about the world through the tools we use. In an interview conducted with a

technology manager (interviewee-four), he shared with me studies and observations that his

company did regarding programmers. He told me that senior programmers are very good at

scanning the screen where the software code is displayed, and very quickly get a 'feeling' for

potential problems with the code. They are also incredibly good at typing lines of code. One can

observe how their fingers move across their keyboards almost unconsciously while their eyes are

focused on the screen and their minds are focused on the end-goal, whether it be a new software

function or correcting a defective piece of software. Interviewee-four also told me that his

company encourages their senior programmers to mentor junior programmers. It is part of the

company strategy to share knowledge among employees, and so far, it has proven to be very

effective in training junior programmers. This would not surprise Tomasello (2014), a

developmental psychologist, who says working together and learning from each other is a natural

activity in which most people like to engage. For him, learning happens by a process he calls

"joint attention," which in a simplistic way means 'I show you that I am attending to something

and I also know that you are attending to it along with me,' and the same is true for the other

individual. His studies have shown, for example, that babies begin to learn a language when they

can hold cognitive attention jointly with their parents or caretakers. Furthermore, Tomasello

argues that the history of the evolution of humanity is the history of cooperation and mutual

learning. Meaning-making is bound by social cooperation. Another way of putting this is that

humans have dominated the planet not because of our capacity to think and reason individually

but because of our ability to think socially, learn from others, and cooperate with others.

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[23] Merleau-Ponty describes the use of the cane by blind people and how they can sense their environment
while using the cane. Elsewhere, Ihde describes how an expert dentist is able to feel tiny cavities on the
surface of teeth while using a metal spike.

Lieberman also has a similar argument for our species' preference to work with others. He writes that "social reasoning is what allows us to build and maintain the social relationships and infrastructures for teams to thrive" (2013, p. 7-8), and that our brains have evolved to learn from and mirror the people around us. Furthermore, he suggests that our brains prefer to be engaged in social thinking as frequently as possible, and that it is better for us, even for our physical health, to work with others.

To understand how we acquire personal knowledge, we must examine the knowledge that exists in our social networks.[24] Personal knowledge cannot be satisfactorily understood if it is not placed in a broader framework of knowledge that includes the social aspect of the individual. Everyone in a group participates in social knowledge in one way or another. Each individual has something to offer to others, either intentionally or unintentionally. Thoughts that we internalize (i.e. 'common sense') are ideas that the members of that social network share. This 'common sense' is passed to new members when they join the group. The social networks could be as small as a father, a mother, and a child, or as large as community groups, or institutions. An individual is part of many social networks, and each one of these networks influences how the person acquires personal knowledge. For example, we often hear parents say that each of their children are different although they grew up in the same family unit and were treated the same way by their parents. But, that is not the case. The family unit of two parents and one child is different when a second child, and a third child enter that family unit. By the time the second child arrives, the parents have more knowledge about raising children than before they became parents, and that knowledge influences how they act with the second child. The way that the first

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[24] When I use the term social networks; I am referring to all types of social groups, such as a family group, school or work groups, industry groups, church, social groups, etc. These groups also drive the culture that affects each of the members of that group. Individuals are exposed to many cultures at home, at school, in the neighborhood, at work, etc.

child learned from his parents is different from the way the second child learns from the parents. Furthermore, the second child not only learns from the parent but also from the older sibling. It is the same thing once the children attend school. Every social network, whether that is the classroom or a group of friends, influences the acquisition of personal knowledge. We do not learn without aid from others. Richards captured this sentiment accurately when she wrote: "people need each other in order that out of the multitude a whole image may be formed" (1989, p.113). For Richards, people need other people (i.e. communities) because they provide fundamental grounds for instruction and learning. Matthew Lieberman, a psychologist and a researcher in social neuroscience, explains that this need to cooperate and work with others is because we are built "to take pleasure in cooperating and helping others" (2013, p. 91). In fact this could be considered a selfish act since our brain rewards us for supporting other people by making us feel good about ourselves when we do so. The personal challenge that some of us face when we think of knowledge sharing and sharing in general is that we have been taught that people are self-interested, and so our tendency is to conform to this cultural bias. Social psychologist Dale Miller, as reported by Lieberman, has demonstrated in various experiments that people frequently describe themselves as being more selfish than they really are. These findings are encouraging for organizations that want their employees to share their knowledge with others. Lieberman notes that it would be wonderful "if we were taught about this at school and we understood that altruistic helping is just as natural as being selfish" (2013, p. 98), and that would go a long way to eradicating social misconceptions about our human nature and instead, we could take full advantage of our predisposition to learn and share.

Reclaiming Human Connection
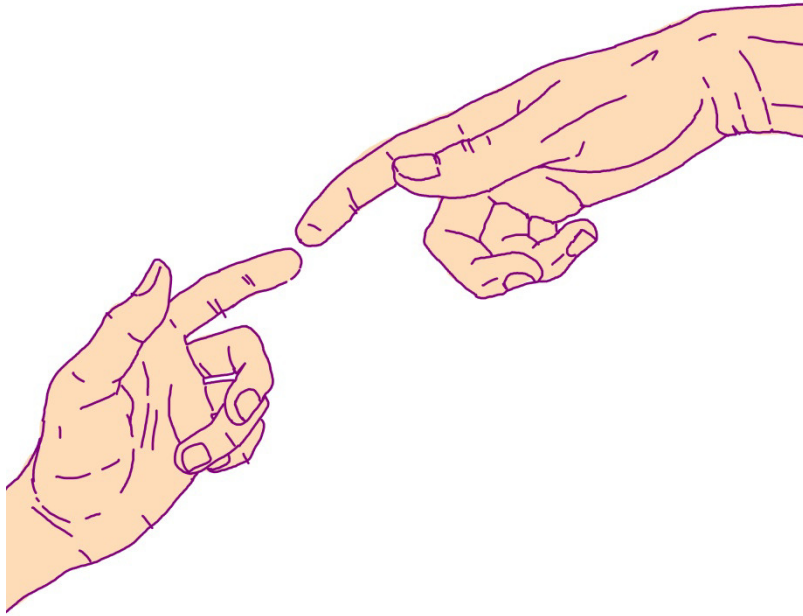
Alejandro Salas-Strus. 2018

RECLAIMING HUMAN CONNECTION

Though nature weigh our talents, and dispense

To every man his modicum of sense,

And Conversation in its better part

May be esteem'd a gift, and not an art,

Yet much depends, as in the tiller's toil,

On culture, and the sowing of the soil.

Words learn'd by rote a parrot may rehearse,

But talking is not always to converse.

Conversation. William Cowper (1782)

The Loebner competition, based on the Turing test, is one of the most anticipated and debated competitions in the artificial intelligence field. In 1950, British Mathematician Alan Turing proposed an experiment to answer the question of whether a machine can be considered intelligent. The process that he suggested, commonly referred to as the Turing Test, engages people—called judges—in text-based conversations with a combination of other humans and computers.[25] The judges, seated in different rooms, do not know if they are interacting with another person or with a computer. If they are unable to recognize that they are conversing with a human more than 30% of the time, then the machine is assumed to be intelligent (Peters, 1999, p. 233-234; Christian, 2011, p. 4). The Oxford Dictionary defines conversation as "a talk, especially an informal one, between two or more 'people', in which news and ideas are exchanged" (Oxford Living English Dictionaries, 2018). The word 'conversation' comes from

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[25] The test itself is a variation based on a popular Victorian parlor game where a judge is asked to determine if a person providing answers behind a curtain is a man or a woman (Lanier, J. 2010, p. 30). Turing replaced the woman with a machine. It is well known that Turing was cruelly persecuted for being gay.

the Old French 'conversacion' and the Latin 'conversationem'.[26] It is derived from words that

mean 'to keep company with; to lean or bend towards each other; to share a space; to interchange

thoughts and sentiments.' These words imply kinetic and caring relationships. They imply that

'my body and my mind are paying attention to your body and your mind.' For Turing the

presence of a body, or an image or voice of a person, was completely irrelevant for trying to

determine intelligence, he wanted what Durham Peters calls 'Ghost to Ghost communication' to

avoid any bias (Peters, p. 234-235).[27] Turing also knew that "the presence of the speaker's body

is no guarantee that genuine interiority is being tapped" (Peters, p. 236), and the speaker might

simply repeat words from memory without a real understanding of them. Unfortunately, Turing

did not live long enough to clearly explain the reasons behind his idea of the human-computer

conversation test, nor did he have the opportunity to witness an actual test being carried out.

Consequently, there are many competing interpretations of the Turing test, how to conduct it,

and how its outcomes impact our working definitions of the terms 'intelligence' and 'thinking.'

Whether or not a human can have a 'conversation' with a machine has long been a

popular topic in our cultural imagination. With the advances in natural language programming

made famous by Apple's *Siri*, Amazon's *Alexa*, Microsoft's *Cortana*, and Google's *Assistant*, in

addition to advances in robotics for home, this has become an area of increased relevance to the

average person. Some conversation-simulation software programs, called 'chatter-bots,'[28] are

already in use. DHL, for example, uses a chat-bot system to offer customer support online,

reserving human operators for second-level interactions when the computer is stumped. In a

recent artificial intelligence conference, I attended a demonstration of a chat-bot developed to

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[26] "Origin: Middle English (in the sense 'living among, familiarity, intimacy'): via Old French from Latin *conversatio(n-)*, from the verb *conversari*" (Oxford Living English Dictionaries, 2018).
[27] Peters quotes Turing from his book *Computing Machinery*. (1999, p. 434-435)
[28] Conversation simulators [called chatter-bots or chat-bots] are computer programs which give the appearance of conversation with a user in natural language. (Alder & Hutchens, 1998, p. 271).

help university students keep track of deadlines for assignments, dates of quizzes and exams, and to answer questions regarding students' finances. Over the last twenty-five years, we have also seen the use of avatars and robots that simulate human actions and emotions to engage humans in 'conversations,' and to provide companionship to people – Japan in particular is a pioneer in this field, focusing specifically on care for the elderly. With all the interactions happening between humans and machines, one needs to ask questions about the meaning of conversation: can machines really think? Are experience and emotion absolutely necessary for conversations? Can machines learn to have experiences? What is the role of listening? At what point should we consider a machine intelligent enough or 'alive' enough to sustain a real relationship?

Turing was not the first one to discuss the potential advancements in technology that would eventually lead to humans engaging in meaningful conversations with machines. In the seventeenth-century, Descartes, as quoted by Oppy, G. and Dowe, D, wrote in *Discourse*:

> If there were machines which bore a resemblance to our bodies and imitated our actions as closely as possible for all practical purposes, we should still have two very certain means of recognizing that they were not real men. The first is that they could never use words, or put together signs, as we do in order to declare our thoughts to others. For we can certainly conceive of a machine so constructed that it utters words, and even utters words that correspond to bodily actions causing a change in its organs. … But it is not conceivable that such a machine should produce different arrangements of words so as to give an appropriately meaningful answer to whatever is said in its presence, as the dullest of men can do. Secondly, even though some machines might do some things as well as we do them, or perhaps even better, they would inevitably fail in others, which would reveal that they are acting not from understanding, but only from the disposition of their organs. For whereas reason is a universal instrument, which can be used in all kinds of situations, these organs need some particular action; hence it is for all practical purposes impossible for a machine to have enough different organs to make it act in all the contingencies of life in the way in which our reason makes us act." (Oppy, Dowe, 2011, p. 1)

In 1997, the artificial intelligence community celebrated IBM's Deep Blue chess victory over Gary Kasparov. Many believe that humanity crossed a bridge of no return on that day, to a world where computers are more intelligent than people. However, it was conveniently forgotten that Kasparov admitted to making an unusual mistake and asked for a rematch, which IBM quietly declined before canceling the program. We also tend to ignore that those computer algorithms and the brute computing power that bested Kasparov were designed by people and not the result of any type of machine self-developed intelligence or creativity. Computers have proven to be tremendous in managing logical processes and doing mathematical calculations. However, seemingly simple things like detection of facial expression, speech recognition, or peculiar speech patterns (such as mumbling) have proven to be decisively more complex, thus extremely difficult to program. For Peters, "it is human frailty, rather than rationality that machines have difficulty mimicking" (1999, p. 237) because conversations go far beyond simply taking turns to talk. To converse means to listen, observe, and interpret the voice, the tone and the silences. Chatter-bot programs that compile millions of everyday conversations have a difficult time answering questions that go outside of their pre-defined algorithms and are unable to hold long conversations that require knowledge of the history of that conversation.[29] "Human speech exceeds puzzle-solving intelligence, since it is always linked to possibilities of embodied action, which is why questions of ethics, sex, politics, life, death will elude the machine" (Peters, 1999, p. 236). Therefore, to ignore the role of sentiments and eros in defining intelligence and conversation is troubling. Turing and many of his followers desired to make indistinguishable copies of human intelligence and conversations, but just as it is impossible to make an

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[29] Judea Pearl, an AI pioneer and winner of the Turing Award for science has become one of the sharpest AI critics. He argues that current AI has not really evolved from the previous generation of AI programs and it has to do with the fact that we don't yet understand how thinking works.

indistinguishable copy of a work of art because the reproduction lacks the 'aura,' as Walter Benjamin (1936) argued in *Work of Art in the Age of Mechanical Reproduction*, it is impossible to attempt to copy human conversation without eros. "Eros is the relation of one body to another and something that cannot be ignored in communication" (Peters, 1999, p. 240) and human relationships tend to be messy and unpredictable, so much so that they defy the limitations of a predefined algorithm. Conversations between humans and machines are exchanges of oral or written data only, whereas interacting in the flesh, Peters states, produces "so much data on so many levels" (2015, p. 273). Consider the information communicated by the way we shake hands or the pauses that we take while speaking, or the gestures we make while listening; all these are incredibly data-rich activities.

Jared Lanier, an Internet computer engineer pioneer, and now Internet critic and author, challenges us to think about whether the machines are getting smarter with every new version of their software, or people are acting dumber and lowering their expectations to the point that machines appear intelligent (2010). He cites several examples where "people degrade themselves in order to make machines seem smart all the time," he adds that "if you can have a conversation with a simulated person presented by an Artificial Intelligence program, can you tell how far you've let your sense of personhood degrade in order to make the illusion work for you?" (p. 32). Others have also criticized the judges of the Turing test on the few occasions when they mistakenly selected the program as a human. For Jack Copeland, it is a testament of the judges' gullibility or in some instances, it was the result of an atypical performance of the program combined with luck, but in no way was it a sign of an intelligent machine (2001). Peters warns us to be suspicious of technologists that pretend to offer communication platforms that are the same as face-to-face interactions (2015). An important element of human-to-human conversations and

connection is emotion, and as Antonio Damasio explains, "the world of emotions is largely one of actions carried out by our bodies, from facial expressions and postures to changes in viscera and internal milieu"[30] (2010, p. 109). Furthermore, because emotion is dependent on the body, it cannot be understood by an algorithm.

MIT Scientist, Joseph Weizenbaum, wrote one of the first prominent natural language processing computer programs capable of interacting with the users in a simulated conversation. The year was 1966 and the program name was ELIZA. Its function was to reflect in words what the user was typing. It had no concept of emotion or feelings; however, it proved very successful in deceiving people by making them feel like ELIZA was listening to them and was being empathetic about their dilemmas. This deception disturbed Weizenbaum to the point where he regretted his creation and became an outspoken critic of artificial intelligence. Nevertheless, it was too late after ELIZA was released; there was no turning back.[31] Forty years later, many companies have built on ELIZA to create programs that present themselves "as companionships to millions who play computer games on the Internet," (Turkle, 2011, p. 24) and for many users, it feels natural to converse with these programs, called bots, about daily events, game strategy or romantic affairs. This willingness to engage with bots is not a testament to the bot's intelligence, but of our readiness to accept this type of human-machine interaction. Nowadays, such algorithms—armed with dictionaries and large databases of text conversations—are likely to satisfy Turing's definition of intelligence. On the other hand, algorithms cannot "reflect our unusual intuitive concept of thinking,"[32] (p. 532) as Copeland points out.

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[30] 'Viscera and internal milieu' refer to changes in our gut. In other words, a 'gut feeling'.
[31] In 2006, the United Kingdom's National Institute for Health and Clinical Excellence recommended that a cognitive-behavioral software be made available to patients with mild depression (Christian, 2011, p. 77).
[32] The earliest known objection to Turing came from Shannon and McCarthy in 1956.

New programs developed after ELIZA have participated in the Loebner competition and are being used in the private sector. One of these programs is MegaHAL. Hutchens and Alder (1998) describe the program as a conversation simulator which responds in natural language to what is typed on a keyboard. They add that, MegaHAL can 'learn' what to say by observing the things which you write to it. There are hundreds of people interacting with this program every day and they report feeling insulted, angry, pleased, and impressed when conversing with this program, and for Hutchens and Alder the fact that a computer can cause such emotional response in humans is interesting, but what is most interesting is how easily human beings can be manipulated by a program (1998, p. 271-274). Most of the time, MegaHAL generates gibberish; but occasionally its responses are contextually appropriate. This, of course, gives ammunition to its programmers to make claims of computer intelligence (Hutchens & Alder, 1998, p. 273). What we need to keep in mind is that Turing machines and software, Christian suggests, are being modeled on the way a person would usually go about solving rather simple problems (ones subject to certain rules of engagement) but cannot replicate ambiguous and complex processes (such as the way a person recognizes faces or the way a group of people engage in conversation).

One of the main problems with the current versions of chat-bots is that they have been created as expert systems designed to operate within specific domains, to perform specific tasks, and to engage in specific types of conversation. In contrast, human conversations are not subject to pre-determined boundaries. People tend to wander in many directions and move the conversation into whichever path the participants want to go. For example, if we are talking about political leaders, we could compare their policies, their proposed budgets or salaries, but we might just as easily talk about their sartorial tastes. We could begin to talk about their views on international issues and end up discussing child labor in developing countries. Human

conversations change course based on the discursive space that the two participants co-create. There is no formula or algorithm, so much as there are a series of exchanges, wherein the topic of the discussion shifts as the participants take turns responding to the other. The additional problem is that computer programs are mostly learning from our text conversations, which not only differ grammatically and linguistically from other types of written text (emails, letters, essays), but also differ in terms of the rules governing the exchange. For Christian, the context of a given conversation is more important than the actual words used. He explains that "so much of (live) conversation is about the extremely delicate skill of knowing when to interrupt someone else's turn and when to pass on your turn, when to yield to an interruption and when to persist" (2011, p. 162). He adds that "computers understand little about verbal harmony and even less about rhythm" (2011, p. 162). The types of subtleties Christian describes aren't being taken into consideration as part of the design of chat-bots or robots, at least not yet. Furthermore, humans rely heavily on metaphors and storytelling during conversations and "are the only species that live in a world erected by the stories they tell," (1998, p. 175) writes G. Gerbner. In other words, metaphors, stories, and context play key roles in the conversations we have with friends and strangers, and as such, do not follow exact rules and patterns every time we engage in discussions—even when those discussions are on the same topic. Today, software programs are attempting to manufacture stories not based on life experiences but based on mathematical algorithms. The result might be that we are misled into thinking that a person no longer needs other people with whom to share stories and thus we are liable to continue marching towards greater isolation of the individual. Many of the interviewees agreed that stories play a key role in mentoring and knowledge-sharing but more importantly, they identified stories and storytelling as elements that help create bonds and connections between people.

In the beginning stages of artificial intelligence development, the most frequently asked question was whether machines could really think. While this question continues to be debated, robots have been making inroads into social spaces in the form of children's toys. When we ask our children to care for a machine, and when this machine simulates thriving in response to the care its given, the result is not just the perception that the machine is intelligent, but that our children have made a veritable commitment to a relationship with this object. Turkle writes about this easy attachment by describing that the "objects don't so much fool us into thinking they are communicating with us; roboticists have learned those few triggers that help us fool ourselves. We don't need much. We are ready to enter the romance" (2011, p. 20). Relationships with robots can go beyond mere play when children begin to consider these machines as confidants and deem them 'alive enough' to be loved. Many children expressed these sentiments towards Furbies in the late 1990's when these toy robots became very popular. Robots have the capacity to manipulate and evoke feelings of attachment. Freedom Baird, as reported by Turkle, from MIT Media Lab, conducted a test[33] by asking people to physically invert three things: a Barbie doll, a Furby, and a gerbil. Blair recorded how long people could hold these things upside down before their emotions took over. The results were surprising, "people are willing to be carrying the Barbie around by her feet, slinging it by the hair…no problem…People are not going to mess around with their gerbil…but when it comes down to Furby, people will hold it upside down for thirty seconds or so, but when it starts crying and saying it's scared, most people feel guilty and turn it over" (Turkle, 2011, p. 45). According to neuroscientist Antonio Damasio, this emotional response is not surprising as people tend to react emotionally to pain when it is either inflicted directly on their own body or via an internal representation that is created when they imagine the pain of others. In the case of the Furby, although people might realize it is only

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[33] As reported by Turkle (2011), and in the spirit of Turing.

a toy, the initial response is an emotional one and companies are betting on these emotional responses to continue developing companionship-robots.

As expected, a new generation of robots is being marketed but these robots, with price tags in the thousands, are not for children. The target market is adults, and many of them are specifically targeted at the elderly. Horowitz (2010) describes how the robots are used for all types of tasks: from lunch carts to human companions, to assist seniors and the homebound with day-to-day tasks as well as communications with family members. One of these robots named Kompaï is used to help seniors organize their schedule, navigate through video conferencing software and provide 'emotional support.' Kompaï has been sold to hospitals, geriatric centers and homes in France, Hungary, and Austria. The company has plans for expansion to the rest of Europe, Asia, and North America. Most of these robotic companies are preparing themselves for when the baby boomers reach an age when they need additional help and companionship.

Artificial intelligence scientists at MIT have also designed a couple of robots, named Cog and Kismet, that are intended to learn in a nurturing, human environment by interacting with people. Duncan Graham-Rowe, a technology and science writer, describes Kismet as a (disembodied) head-only-robot that learns about its environment like a child, depending almost entirely upon benevolent caregivers to help it find out about the world.[34] Built with human facial features, the robot is able to simulate emotions and feelings and this could prove to be an invaluable function to gain a person's affection and attachment. Turkle is concerned that this type of a robotic face "encourages us to imagine that robots can put themselves in our place and that we can put ourselves in theirs…A robot's gaze, face, and voice allow us to imagine a meeting of the minds" (2011, p. 85, 129), and in doing so we are replacing what should be

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[34] Graham-Rowe, D. (22 August 1998). *Meet Kismet*. The Scientist Magazine. Retrieved from: https://www.newscientist.com/article/mg15921480-800-meet-kismet/

human-to-human connections with human-to-machine connections. Companies are moving into the territory of manufacturing empathic friends that possess repertoires of responses driven by emotive and behavioral systems (Graham-Rowe, 1998). According to the Japanese manufacturer AIST, their robot named Paro is designed to behave like an animal pet and be used in hospitals, extended care facilities, and homes for seniors. The company claims that "Paro improves the socialization of patients with each other and with caregivers… Paro can learn to behave in a way that the user prefers… and [it] responds as if it is alive, moving its head and legs, making sounds, and showing [the owner's] preferred behavior."[35] The supporters of these types of technologies in nursing homes argue that it helps people deal with isolation and a lack of companionship. Robots evoke feelings of affection from seniors, and because they successfully simulate needs, they function well at the emotional level for people who like to feel useful. While at the surface these machine-to-human interactions might seem harmless and appear more financially efficient than having a nurse spend time with a senior in need of companionship, it is important to recognize that robots are incapable of being truly empathetic. For Turkle, we are asking "technology to perform what used to be 'love's labor': taking care of each other" (2011, p. 107), and in doing so, we are able to minimize or altogether avoid human to human communication. These technologies allow us to provide care for loved ones without having to do any of the care work ourselves, thereby easing our consciences.

We are beginning to think of children and the elderly, particularly those with illnesses, not as people who need other people as caregivers, but increasingly in terms of the allocation of resources (time, and cost) and we look to technologies to solve what are in fact social issues. A robot, Turkle writes "establishes itself in a therapeutic landscape, creating space for conversation, even confession" (2011, p. 111). She tells the story of a nursing care resident that

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[35] Company website: http://www.parorobots.com/

has fallen in love with his robot to the point of renaming it after his late wife. He tells Turkle, "when I wake up in the morning and I see (the robot) over there, it makes me feel so nice. Like somebody is watching over you" (2011, p. 111). This man is using his robot to remember how life was and to express his feelings. While this might be similar to writing in a diary, it is incomparable because a notebook is not expected to provide feedback, be understanding or express feelings of any kind. People might need to be heard, but robots cannot hear, they just process sounds and play on our vulnerabilities using predefined rules. These technologies can only give us the illusion of caring relationships. Designers of these types of robots appear to disregard feelings and emotions as human characteristics.[36] They believe it possible to reduce feelings to pre-defined processes, governed by discrete rules that machines and humans can simply learn in order to respond to each other appropriately.[37] But it doesn't have to be that way. Turkle (2015) and Broussard (2018) suggest that we ought to spend less time and resources trying to model human traits in machine code, and instead think about how human vulnerabilities and emotions can help us design technologies that can complement human effort and aid human relationships.

For most people, personal relationships are very important and are the sources of both enjoyment and frustrations in their lives. Steve Duck, psychologist and communication scholar, points out that most of us don't realize nor appreciate the role communication and conversations have in our lives. He says, "it is very clear, but often under-appreciated, that daily events are

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[36] Or at least living organism's characteristics.

[37] To illustrate this point further: there is an area of study within artificial intelligence that is called 'affective computing or emotion AI'. This field of study is attempting to create algorithms that learn to simulate human emotions, including empathy. However, one must exercise caution when technologists refer to machine-learning. For Broussard, a machine cannot learn, it can only become more accurate at performing tasks according to specific designs (2018). This linguistic confusion plays well within the technology community that would like to push robots and chat-algorithms as substitutes for human connection and conversation.

typically centered on and intertwined with our relationships in remarkable ways. It is so obvious as to be unremarkable" (1988, p. 6). We not only learn facts and rumors when we associate with others, but we also learn how to interpret that information and use it in the way we behave and the way we converse with others. People model their speech and behavior on the actions of others, and some people even adopt mannerisms and expressions from television show characters (Duck. 1988). With the expansion and adoption of chat-bots and robots, we should not be surprised when people start modeling their language and behavior after these machines. A flight from human relations and interactions, particularly for children, will not help us learn to better navigate emotional and nonverbal subtext. For Turkle, children develop the foundation for emotional stability when they make eye contact and actively interact with engaged faces (2015, p. 25,36,170), particularly those of their parents and caregivers.

Chat-bots and robots are just a couple of examples of technologies that can negatively influence the way we relate to each other. For Neil Postman (1993), the practice of medicine is being transformed substantially with the use of technologies that are viewed as the only source of reliable patient data. He is concerned that physicians are moving away from actively engaging with their patients and are not "making careful observations of exterior symptoms" (p. 99). In doing so, doctors are losing the ability to conduct skillful physical examinations and thus are also losing out on the opportunity to develop experience, intuition, and insight. Postman explains that medicine has gone through three stages: the first stage was characterized by the patient communicating directly about the symptoms and the doctor asking questions and making observations. The second stage was characterized by doctors doing physical examinations with selected tools, and finally, in the third stage, there is only an indirect communication with the patient's body as technology has taken over the production of all patients' data. In this third

stage, there are hardly any opportunities for doctors and patients to develop trusting relationships. In his book *The Digital Doctor*, Robert Wachter (2015) remarks that computers have transformed the healthcare industry entirely, including the relationships between doctors and patients, and not everything has been for the better. He argues that medicine is about gathering the information needed to make an accurate assessment of the situation and come out with the best possible treatment. However, this information is no longer gathered through the conversational exchanges between doctors and patients, but mostly gathered as data from tests and monitoring devices. Dr. Wachter sees a big problem when physicians are no longer engaging in eye contact with their patients. For him, eye contact is associated with higher levels of empathy and is fundamental to building reliable connections and trust between doctors and patients. He quotes Dr. Abraham Verghese, who shares the same concern when he writes that "we are losing our ritual [eye contact] that I believe is transformative, transcendent, and at the heart of the patient-physician relationship" (p. 26). This ritual, he concludes, tells the patient that she is not alone, that the doctor is there for her and is ready to confront the health challenge together with her. Verghese, devised the term 'iPatient' to bring forward the warning that the healthcare industry is viewing the patient as an entity that can be described using binary nomenclature, and hence, she becomes a less 'real' patient. A 2013 study performed by researchers at Johns Hopkins hospital concluded that during patient visits, a typical physician only spends twelve percent of her time talking to her patients and forty percent of her time on the computer.

At a recent conference on educational standards for colleges and universities, I spoke to several school administrators who told me that many of the lectures offered by their schools are video-recorded for students to watch at their own leisure. What they have observed is that around

50 percent of the students do not attend the lectures and only watch the videos. When I asked why they don't stop offering this service, the common answer was that prospective students would not enroll at their school unless these types of video-services were offered. Furthermore, I was told that they need to advertise that they have high-definition recordings of the lectures with options for students to view the recording at different speeds and from different cameras. In most cases, they found that students watch the lectures at twice the normal speed. When I asked a professor how he felt about students not attending classes and choosing to watch them at home at a different time, he remarked that there isn't a simple solution. He said that students who attend classes are also often not 'really there' the whole time, instead, they are busy texting and multi-tasking; it is extremely challenging to keep their attention. Nevertheless, he added, as a teacher he could see at times a puzzled look on a student's face and then he would know that he needed to explain something from a different angle. However, if the students are not present, then the same teacher said he would just have to assume that what he was saying was understood. He added that an important aspect of teaching is immediate verbal feedback, and that is something that seldom happens these days.

Massive Open Online Courses, or MOOCs, have been hailed as revolutionary because they present so many opportunities to measure numerous elements, such as attendance, participation, how long a student spends on a specific module, etc. These courses can also reach a much broader audience than any classroom could accommodate. Coursera, the largest provider of MOOCs in the world, offered over 2,700 active courses as of January 2018. EdX, another provider boasts a catalog of *1,800* courses, while FutureLearn provides *700 plus* courses. There is an obvious appeal to courses that can be accessed from anywhere at any time, and the opportunities that come with them to build online communities. However, even with all these

conveniences of online courses, schools and professors are finding out that learning significantly increases when online courses are combined with face-to-face contact between students and faculty. Turkle reports that "even in the most technical subjects, such as an introduction to calculus, students in online classes do better when the curriculum includes face-to-face encounters" (2015, p. 230). It might not only be cognitive skills that are better acquired in traditional classrooms, but also non-cognitive skills. As Andrew Ng, co-founder of Coursera concedes, online courses cannot teach "team-work, ethics,[nor] the ability to regulate anxiety" (as quoted by Turkle. 2015, p. 230). Physical classrooms are not only places to transfer information and acquire the necessary training to make use of facts and ideas but are also places where we have opportunities to develop real-life relationships between learners, and between learners and teachers. In other words, when we share physical spaces and we take the time to engage in conversations, we have a chance to create meaningful connections.

As we continue to have more encounters with chat-bots and robots, we need to ask ourselves not what these machines are doing for us, but what they are doing *to* us. Are we changing our own perception of what it is to converse or to care, so that we can then adequately interact with machines? Are we willing to replace human relationships with machine relationships for economic reasons, or because we might be amused by their presence? Turkle's concern is that while relationships with robots are increasing, relationships between people are decreasing (2011, p. 19). Furthermore, she argues that when we take robots as companions, we lose the ability to see the world through someone else's eyes, and when we stop listening to a friend, we lose the ability to empathize. Empathy is learned when we are around people, and according to Turkle, researchers are confirming, that to develop empathy, one needs to engage in eye contact and face-to-face interactions (2015), something that robots cannot provide, much less

teach. People might be persuaded by the predictability of technology's behavior to choose a robot or a software program as a confidant instead of risking having to rely on a human being, who may be impulsive, moody, or obsessive. However, by making that choice, people could miss having friends that are also caring and loyal (Turkle, 2011).

Social psychologist, Steve Duck states that it is natural for people to look for company from others (1988). Many of us like being included in social groups and want to feel heard and understood by others. Duck explains, "humans like to relate to other people," (p. 12) particularly to people who share our ideas and social values or who are our family members or friends. Relationships make our life meaningful but developing a relationship is not something that happens instantaneously. It usually starts with feeling positive about an individual and then acquiring knowledge about that person and vice versa. Duck elaborates in his relationship theory that "the more the relationship develops, the more we get to know about our partner; conversely the more we get to know about them, the more the relationship develops" (p. 41). It is a cycle that requires time and emotional commitment from both parties. For Matthew Lieberman, a psychologist and a researcher in social neuroscience, our need to connect socially is powerful across cultures even in Western culture where we place more emphasis on individualism and personal pursuits (2013). He explains that our social connections profoundly shape us and we suffer greatly when those connections are threatened or severed. Furthermore, he argues that evolution wired us to make connections with others and to see the world socially. And by doing so, we learn from one another. However, although it might be natural to have a desire to connect, knowing how to spark and nurture human connections are skills that could vanish if our daily exchanges with other people become less and less valued. For Gary Small, when we have too much involvement with technology at the expense of physical social encounters our

"nonverbal communication skills, such as body language expression and interpretation tend to suffer" (2008, p.106). He points to several studies that suggest that nonverbal signals constitute a higher proportion of what we communicate to other people than the words we use (p. 124). The research on human connection could have significant implications for education and training. The most common theme that arose during the interviews I conducted on mentoring and learning from others was that the success of many people's learning experience depended on a relationship between a mentor and a mentee based on openness, mutual respect, and trust. This caring relationship constitutes the foundation for a connection that leads to mutual learning. The need to belong to a social group and feel connected, for Lieberman needs no ulterior motive (2013). This might be the reason, according to Daniel Levitin (2014), a professor of psychology and neuroscience at McGill University, that crowdsourcing has been used successfully for many projects even though there is no obvious financial gain for the participants. He cites several examples such as the development of navigation systems and the reCAPTCHA algorithm to prevent bots from illegally accessing websites that have been created by people who want to be part of a project that helps others. Interviewee-seven told me that people genuinely want to share their knowledge with others in their communities, and they do so by participating in many local internet forums where they can provide useful information about their cities and neighborhoods. Sharing knowledge and information provides a sense of belonging and a feeling of doing something together, with purpose. Human connections appear to be foundational to personal well-being and provide the basis for coming together to collaborate and engage in shared activities. The need to support and encourage human-to-human connections should be a priority for organizations trying to have a workforce that feels engaged[38] and willing to participate in

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[38] I define engagement in the workplace as the relationship between the employer/manager and the employee, as well as the relationships between employees. Employees choose to contribute varying

mentoring activities. For author and Harvard professor Robert Putnam, computer-mediated communication's role is to complement face-to-face interactions. He quotes MIT researcher Dertouzos who argues that only unimportant business relationships and casual social relationships can be established and maintained in virtual environments and that "physical proximity will be needed to cement and reinforce the more important professional and social encounters" (2000, p. 179-180). What Putman and Dertouzos are arguing is that computers should support but not replace human-to-human relationships. Having said this, face-to-face interactions might be critical to developing a sense of connection among people, but it is not enough in and of itself. The process of 'connecting with someone' comes with obligations that help bind relationships. In a mentorship program, for example, participants have responsibilities to take time to participate, to speak, to listen, to provide feedback, to accept criticism, to help each other learn, and to cooperate for mutual benefit. For Putman, there are many factors that affect connections between individuals and the lack of engagement of individuals within their communities. These factors include: the loss of formal settings (evidence suggests that social connectedness requires formal settings such as community centers, union halls, school usage by the community, and most important, the family setting. There is substantial evidence of the loosening of bonds within the family –both extended and nuclear); decline of leisure time (it suggests that people have less time to engage with one another outside of their workplace and thus are less likely to cooperate in community initiatives); economic pressures (it suggest that single parent families and two-career families have little or no time to connect with other members of their communities); mobility (North Americans in particular, when compared to other parts of the world, like to move locations frequently which makes it more difficult to

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degrees of personal physical, emotional, and cognitive resources in exchange for the benefits they receive from their employers and co-workers.

establish and keep physical connections when there is little residential stability); technology and

mass media (the excessive time spent using social media, playing video games, and watching

television[39] leaves fewer opportunities for connections (2000, p.185-276).

Feeling a connection to other people appears to be very important not only for our

psychological well-being but also for learning and development. Several of the interview

participants indicated that they had role models, with whom they felt connected, who help guide

their career choices. These role-models were not necessarily in-person mentors, nevertheless the

interviewees felt a connection to them based on the ideas and behaviors they wanted to learn and

emulate. For example, a physician, who was in the group of interviewees, told me that when he

was in school he learned about a physician in Detroit who was committed to universal healthcare

and made his priority to practice medicine in the poor neighborhoods of the city. Later, this

physician went to work in Europe during the Spanish War. While treating injured soldiers on the

battlefields, he invented a method to do blood transfusions on the ground, which saved many

lives that would have otherwise been lost while waiting to be transported to the nearest hospital.

What interviewee-five said was that after learning about this American physician he knew he

wanted to follow similar footsteps. Other interviewees also felt a connection with leaders in their

industries who did exemplary work, worthy of emulation.

It appears that what is required for organizations that want to encourage knowledge

transfer is to have an environment that facilitates the creation and nurturing of meaningful human

connections. Communication technologies, including social media, can help establish

connections, but they can also make it harder to learn to connect with each other in the flesh. If

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[39] On this particular point, it will serve us well to be reminded of what Adorno wrote regarding television. He stated: "people may not only lose true insight into reality, but ultimately their capacity for life experience may be dulled by the constant wearing of blue and pink spectacles" (1954, p. 230).

we lose our desire to experience life with others unmediated by a screen, we risk losing the opportunity to learn how to cultivate human relationships and have meaningful exchanges of information.

Reclaiming Learning
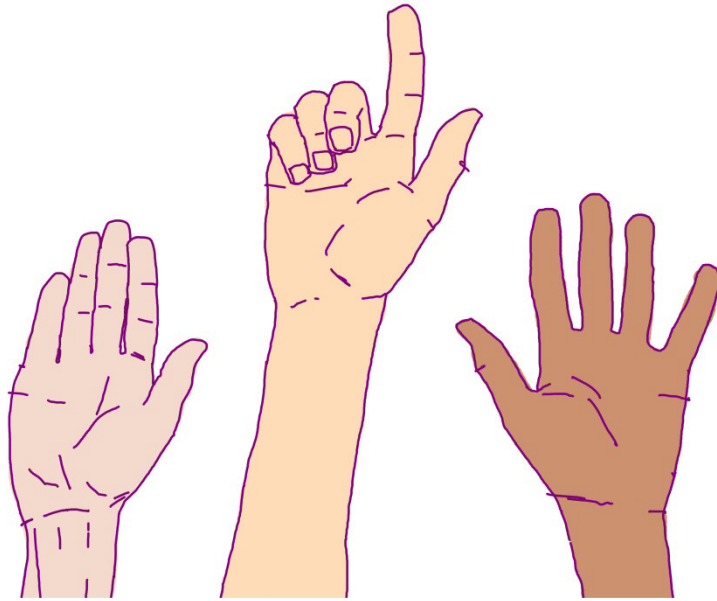
Alejandro Salas-Strus. 2018

Reclaiming Learning

> Learn now the simple truth
> You for whom the time has come at last
> It is not too late
> Learn now the ABC's
> It is not enough but learn it still
> Fear not, be not downhearted
> Again, you must learn the lesson
> You must be ready to lead!
> Learn it, men on the dole
> Learn it, men in the prisons
> Learn it, women in the kitchens
> Learn it, men of sixties
> You must be ready to lead!

In Praise of Learning. Bertolt Brecht (1931)

For John Dewey, education is public business and as such, teaching and learning must be viewed in a different way from other professions and other businesses. A person needs to develop a good command of methods of inquiry that allows him or her to acquire knowledge and skills so that he or she can provide good service to their community (1962). Dewey advocates a holistic approach to education that includes training in scientific fields alongside humanities such as history and creative fields such as visual art. He believed that learning should go hand-in-hand with experience so that the learner can successfully relate the new learned material to the world. Dewey is concerned that students need to learn how to participate in the social life of their communities and for him the only way to get ready for social life is to engage in social life. Dewey (1964) used the analogy that you cannot teach a child to swim by going through the motions or just reading a description of the motions; you must begin by practicing in the water. Learning requires a rounded approach that takes into consideration what is presently happening

around us and requires updating as conditions or the learning environment itself changes. Text, for example, was the primary mode to document information and facts at the beginning of the twentieth-century, but for the last three decades, students had widely different mediums through which to access learning materials, mainly using computers. Our world has become more visual. Images and graphs relay information accurately and instantaneously. It is only fitting to become more familiar with new modes of representation. The prevalent concept of 'literacy' is to learn orthography, and become fluent with text only. In this chapter the emphasis is on the constant *interruptions* from digital media that affect the way we engage in learning activities, the lack of skill most of us possess when it comes to dealing with the *intersection* of several modes of data representation, and the *interference* from media companies, who use draconian copyright laws to restrict and control access to information.

Interruptions

Daily, we interact with technologies that mediate our routines, influence the way we communicate with others, and affect the manner in which we gather and spread information. We use these technologies as if they have always been here, and few of us ever consider what their implications mean for individuals and society in general. Human activity and behavior cannot be properly understood without studying the role of technology. Internet technologies can profoundly influence our behavior and experience, and as a result, they challenge conventional notions of how we access information and how we can learn. For P-P Verbeek (2011) technologies are not neutral, on the contrary they shape the way we interact with the world. He writes "technological artifacts mediate how human beings are present in their world, and how the world is present to them" (p. 5). He argues that technologies can produce unintended

consequences. Constant interruption might be one of those unintended consequences of living with the pervasiveness of digital media.

If you try to be aware of how long you can focus on a specific activity at work, you will not find it difficult to discover the tendency of your mind to wander in different directions and to crave for an interruption from an email, a message or a phone call. We are in an environment in which our senses are so overwhelmed by a nonstop stream of messages, rings, updates, and chimes that it is difficult to find the time and space to engage in reading, learning, working or thinking without some distraction. These distractions come from a variety of sources including computers, smartphones, tablets, and game consoles, just to name a few. There is concern among some psychologists that the constant use of digital media and the ceaseless interferences from these devices might not be good for areas of the brain that deal with memory, learning, and understanding (Carr, 2011; Wolf, 2008).

A national survey conducted in the United States in 2015 reported that teens devote more than a third of a day to entertainment media.[40] Since they spend so much of that time 'media multitasking' (engaging with multiple media at once), they manage to pack in about ten hours' worth of media content.[41] This amount of time is more than what teens spend at school. Taking such staggering exposure into account, it is imperative to explore the potential implications of changes in the sensorium[42] and the way the brain might be receiving and processing this information as a result. For M.A. Wolf, it is crucial that we discuss the challenges surrounding

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[40] Tsukayama, Hayley. (2015, November 5) *Teens spend nearly nine hours every day consuming media*. The Washington Post. Retrieved from: https://www.washingtonpost.com/news/the-switch/wp/2015/11/03/teens-spend-nearly-nine-hours-every-day-consuming-media/?utm_term=.12e56ab9ae4c

[41] The Kaiser Family Foundation.(2010, Jan. 10) *Generation M2: Media in the lives of 8- to 18-year-olds.* Washington: The Kaiser Family Foundation. Retrieved from: /event/kff/Archives/20jan10media/index.html

[42] Sensorium: the parts of the brain or the mind concerned with the reception and interpretation of sensory stimuli (source: https://www.merriam-webster.com/dictionary/sensorium)

how we learn to think. Furthermore, Wolf argues that we must consider the intellectual, social and ethical implications. She writes that we don't yet know whether "an immersion in digitally dominated forms of reading will change the capacity to think deeply, reflectively and in an intellectually autonomous manner" (Wolf, 2010, p. 1).

When we engage in online activities, we are required to pay attention to a variety of texts, images, sounds, and motions. The online environment encourages quick reading, i.e., jumping from one hyperlink to another. It is a system geared to both capture and divide our attention simultaneously. These activities are not conducive to anything beyond distracted thinking and add stress to our cognitive abilities, diminishing our capacity to learn and understand (Carr, 2011, p. 129). Carr has personally experienced the loss of the ability to concentrate and to execute focused reading. He writes "once I was a scuba diver in the sea of words. Now I zip along the surface like a guy on a Jet Ski" (Carr, 2011, p. 7). This approach prevents us from engaging in tasks that require more attention, those tasks that require contemplation and reflection. The act of analyzing the text we read and the process of forming new thoughts in response to it are the result of a combination of the following elements: years of training, conscious time allocation, the desire to undertake a deep reading, as well as a commitment to developing a profound understanding of a given text. Using the internet and various social media technologies, on the other hand, requires an intensive form of multitasking that uses several of our senses in concertation. Dr. Gary Small, a neuroscientist and director of the UCLA Memory and Aging Research Center with co-author Gigi Vorgan (2008), write that "when paying partial continuous attention (multitasking), people may place their brains in a heightened state of stress. They no longer have time to reflect, contemplate, or make thoughtful decisions" (p. 18). We are living in a state of constant urgency, where we try to keep up with everything but accomplishing

very little or nothing. The emphasis is on the process, to rush through the various screens, rather than on the content. Search engines companies like Google, Yahoo, and Microsoft (Bing) and Social Media companies, like Facebook, benefit tremendously by collecting information about us, our search preferences, our clicks, the pages that we have viewed, etc. These companies have built business models around selling advertisement. The content they create is intentionally designed for quick reading and requires luring their audience (through click-bait) endlessly onto new pages to see more content (and hence more advertisements). For Andrew Keen, a self-proclaimed Web 2.0 critic, the last thing that media companies want is for us to read leisurely, and for users to take time to think about what we are being presented on a screen. They are attempting to personalize content to the point that we are fed our own thoughts and preferences, all while making it easier for targeted marketing (Keen, p. 246).

For people like Gary Small M.D. (2008) and scientist Susan Greenfield (2012), the implications of the excessive use of digital technology and multitasking go beyond rendering us unwilling to sustain prolonged attention, engage with linear thought, and perform reflective thinking. According to Small and Vorgan (2008), several studies suggest that the brains of young people are wiring up for rapid fire cyber searches, and parts of the brain used for traditional learning methods, including memory, are being neglected. While this might be an exaggerated warning, after all, Google and Facebook, the two most popular Web 2.0 applications, are only a couple of decades old, and it isn't likely that enough data about changes to the brain can be collected yet to come to such conclusions. However, it is worth considering that when people engage in online reading, they tend to skip from topic to topic in an associative mode of thinking and as a result they are less capable of the sequential thought patterns required for skills like reading and writing at length (Greenfield, 2012). Companies like Amazon have recognized this

trend and now offer short stories called 'Kindle-Singles.' As readers look for faster gratification.

producers are prompted to look for stories that are easy and better suited to their e-readers.[43] For

Aldous Huxley (1962), novelist and poet, technologies that try to automate everything are

depriving us of the opportunity to think, to analyze, to comprehend, to question what we are

doing and why we are doing it. As Huxley wrote, "if we do not choose to use our heads and our

hearts a lot, we shall be in serious trouble in spite of technology, and in some sense because of

it" (p. 129). Web 2.0 tools can be very useful in helping us connect with people in distant places,

and accessing news, information, and entertainment from around the world. Many people have

become very familiar with these tools and use them constantly on their tablet computers and

smartphones. However, being clever about how to perform searches, and how to build

impressive graphical presentations should not be confused with understanding complex ideas, or

how to tackle complex problem-solving. Technology can play an important role in facilitating

access to and the spread of information. However, it is important to keep in mind that although

making information available is indeed a necessary step in knowledge building, nonetheless,

access to information does not equate to acquiring knowledge.

Dr. Clifford Nass (2009), a professor of Communication and Computer Science at

Stanford University, says that "the constant access to electronic devices allows people to avoid

thinking hard... and, it feels like you're doing something" (p. 2). Dr. Adam Gazzaley (2011),

from the Center for Neurological Studies, University of South California, suggests that our

ability to disconnect from these devices is decreasing and that we are creating a dependency not

dis-similar to the addiction of drug users. A Neilson study reported that by 2010, teenagers were

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[43] For example, a website that promotes e-books states that a short story is "a substitute for a novel...like YouTube is a substitute for cinema…Facebook chat for conversation" For example, a website that promotes e-books states that a short story is "a substitute for a novel...like YouTube is a substitute for cinema…Facebook chat for conversation" (Kowalczyk, 2017, February 18)

sending an average of 3,339 text messages per month.[44] The randomness of the alerts that herald

new incoming messages reinforces our dependency on constant stimuli and prevent us from

focusing on doing one task at the time and doing it well. For Carr, our brains are not built to

process tasks concurrently, but sequentially. Yet our current patterns of engagement with

computers reward this kind of erratic multitasking behavior, such as continually checking for

updates on our multi-media devices. Multitasking behavior results in a cognitive overload that

affects our working memory, and the outcome is that we do not perform our tasks correctly

(Carr, 2011; Hattie and Yates, 2013)). We are just not paying close enough attention to anything,

and to make matters more concerning, laboratory tests revealed people experiencing several

simultaneous demands are unaware of their performance deterioration (Hattie and Yates). Some

performance activities tolerate multitasking well, (for example: driving a car while listening to

music and obeying traffic signals) but the same is not true for learning activities such as in-depth

reading or problem-solving. These activities require uninterrupted time and attention.

The influences of technology are not restricted to reading and understanding abstract

concepts, they also have an impact on social interaction and communications. "Technology's

lure can distract us and limit the time we spend in traditional social encounters. With too much

tech involvement, our non-verbal communication skills, such as body language expression and

interpretation tend to suffer" (Small and Vorgan, p. 107). Other studies show that the areas of

the brain responsible for decision making and judgment are negatively affected by excessive use

of computers (Small and Vorgan, p. 49) resulting in reduced levels of empathy in behavior.

Michael Hausauer (2009), a psychotherapist from Oakland, California, writes that teens and

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[44] The Nielson Company. (2010, October 14). *U.S. Teen mobile report calling yesterday, texting today, using apps tomorrow.* [Online]: The Nielson Company. Retrieved from: https://www.nielsen.com/us/en/insights/news/2010/u-s-teen-mobile-report-calling-yesterday-texting-today-using-apps-tomorrow.html

young adults have a terrific interest in knowing what is going on in the lives of their friends while also being plagued by anxiety about being out of the loop and fear the risk of becoming invisible.

A study by the American Psychology Association also found that as people use the Internet more, they reported keeping up with fewer friends off-line. They also reported spending less time talking with their families, experiencing more daily stress, and felt more lonely and depressed overall. These results occurred even though interpersonal communication was their most important reason for using the Internet.[45] Sherri Turkle declares that "anxiety is part of the new connectivity" (2011, p. 242). We are social animals, and the anxiety of being ignored is not easy to handle. These Wystan Hugh Auden poem lines capture the fear of loneliness and gives glimpses of the terror of not having friends:

> Is first baby, warm in mother,
> Before born and is still mother,
> Time passes and now is other,
> Is knowledge in him now of other,
> Cries in cold air, himself no friend.
> In grown man also, may see in face
> In his day-thinking and in his night-thinking
> Is wareness and is fear of other,
> Alone in flesh, himself no friend.
>
> W.H. Auden (May 1929)

Maressa Hecht Orzack (1999), director of computer-addiction services at McLean Hospital of the Harvard Medical School, asserts that some people find the virtual reality on computer screens more attractive than everyday reality, and in those cases, the computer

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[45] https://www.apa.org/monitor/2011/06/social-networking.aspx. Accessed on October 25, 2018.

becomes a tool to evade work, procrastinate and escape. This situation is particularly worrisome for children as some are becoming increasingly inept in social environments, lacking communications and social skills. It will serve us well to remember Dewey when he wrote that "consensus demands communication" (2016). Communities are only formed when their members are able to communicate and understand each other.[46] Small and Vorgan warn that some young people "have gotten so isolated in their digital cocoons that they fall short in their essential knowledge of the practical world" (2008, p. 116). Dewey advocated for active participation in social life, and deemed it essential for teaching and learning. It is the very process of living and working together which provides the experience and education that we all benefit from. If social isolation is a by-product of the excessive use of digital technology, it begs the question of how the next generation, the people in their twenty-somethings now entering the workforce, are going to be able to handle working with others in face-to-face environments. Will they be able to learn directly from co-workers without the computer as an intermediary? It is a challenge that we might very well have to face. We will then need to evaluate if traditional methods of education and knowledge sharing are still effective when dealing with a digitally saturated generation of learners and workers.

Marshall McLuhan, in his book *Understanding Media: The Extensions of Man*, argues that technology, or the medium, does not just perform the intended task, but it also changes our senses and thoughts and transforms individuals and entire societies. "The effects of technology do not occur at the level of opinion or concepts but alter sense ratios or patterns of perception steadily and without resistance" (McLuhan, 1964, 1994 ed., p. 18). Technology has its inherent

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[46] In Dewey's thinking, as nutrition is essential for the body so is education essential for social life. Furthermore, he stated that education consists primarily in transmission through communication, and communication is a process of sharing experiences that can be understood by the members of the community.

effects on our senses independent of the content. It shapes the way we think, learn, view the world and the way we relate to each other in society.

Since the time that McLuhan published *Understanding Media* in 1964, we have experienced an explosion of the development of electronic and media technology. Since the invention of the Internet in the late eighties, computers have become much smaller and more portable, while related tools continue to be created at an astonishing speed to facilitate the sharing and delivery of content. As recently as 30 years ago, we were referring to radio, camera, television, and printed media as vehicles for the dissemination of mass media; the Internet has created a 'new media' that it is more readily available to users, but also more intrusive.

Digital media provides ease of access to information, thereby closing the gap between the producers of information and the consumers. The ease of information dissemination encourages participating consumers to also become producers. Postings on social media sites are intended to solicit a response, to trigger reactions, and encourage conversations and dialogues that in turn lead to new postings. The benefits of digital technology and social media have been articulated in many books and articles. A Google search on the advantages of social media brings back more than one hundred million hits, and a similar search for books on Amazon produces more than six hundred book titles.[47] Computers, via social media, allow us to access information and to reach people at anytime from anywhere, which is definitely a positive advancement but which also comes with negative impacts. It is a lot easier to interrupt people at any time, and these interruptions do not only have to come from friends and acquaintances, but also from employers.

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[47] Google search 'advantages of social media.' And Amazon search in the books section 'advantages of social media.' Conducted on March 10, 2018.

Countries like France have seen fit to introduce legislation to provide employees protection from over-reaching employers.[48]

Although it feels like social media platforms like Facebook and Instagram have been around for a long time, we are just at the beginning stages of the development and adoption of social media technologies. After all, the modern computer is only half a century old, and we are only on Web 2.0[49]. It is precisely this comfortable feeling associated with computer and cell phone use that lulls most of us into the belief that we are in control of our technology and that nothing is changing within us, but the real 'revolution,' McLuhan writes, "is in the prolonged phase of adjustment of all personal and social life to the new perception set up by the new technology" (p. 27). Computers, the Internet, and social media applications will continue to evolve and replace other technologies, and, according to Merzenich, our brains will be massively remodeled by this exposure; there will be substantial neurological consequences. He added, "when culture drives change in the ways we engage our brains, it creates DIFFERENT brains" (Quoted by Carr, p 120).

While it might be difficult to describe precisely how the brain and our senses are affected by digital media technologies, evidence is beginning to emerge that shows just how plastic (adaptable and programmable) our brain is and how much these technologies play a role in altering the physical composition of our mind and our senses (Pascual-Leone, 2005; Jancke, 2009; Green, 2008; May, 2011). This is what McLuhan warned about the impact of all technologies on our senses, "it gives new stress or ascendancy to one or more senses resulting in the ratio among the senses being altered, and therefore, we no longer feel the same, see the same

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[48] This law is known as 'the right to disconnect,' and other countries, like Canada, are looking at similar legislation.
[49] Web 2.0 refers to the second generation of the world wide web where it moved from have static web pages to interactive web pages and as a result it facilitated the creation of social media software application programs.

way, or think the same as before" (McLuhan and Zingrone, 1995, p.120). Gary Small concurs that technology is not only changing the way we live and communicate, but it is rapidly and profoundly altering our brains. Small and Vorgan states that these technologies "stimulate brain cell alteration and neurotransmitter release, gradually strengthening new neural pathways in our brains while weakening old ones" (2010, p.120).

Concerns about the impact of technologies on people and learning are hardly new. Socrates protested the acquisition of literature (written language technology) by arguing that the written word will fool people into believing they have acquired knowledge when in fact they have merely learned to decode and memorize words. For Socrates, the acquisition of knowledge was "a lifelong commitment to developing the deepest critical and analytical skills, and to internalizing personal knowledge through the prodigious use of memory, and long effort" (Wolf, 2008, p. 220). The arrival of the Gutenberg printing press provoked similar reactions, with critics arguing that the easy accessibility to books will create intellectual laziness particularly because most of the books printed were not of a religious or philosophical nature.[50] However, if we look closer, we will see that the printing press in Europe is inseparable from the Renaissance movement and the Reformation of the Church; it has been at the core of the expansion of literacy and the widespread popularization of knowledge. It was not only the church and the state that were able to use the printing press for their books, laws, and propaganda, but it also allowed reformers and radicals to print and distribute their ideas. Henceforth, it was not only the clergy that learned how to read and write, but the middle-class also quickly acquired these skills. The printing press offered a new mode of communication. Today's digital media is giving us yet another way to look at information and to present our ideas to the world, and by doing so, it is

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[50] Elizabeth Eisenstein's (1979) work on the printing press describes the world during the invention of the printing press and the few years that follow as 'chaotic.' Literacy was expanding but so was distrust of authority. She refers to this period as 'revolutionary.'

forcing us to rethink the concepts of communication, literacy, and learning. While concerns about the potential negative impact of excessive technology usage are valid, we should also consider the possibility that young people will develop new skills to overcome such challenges, find different ways of learning, and grow to accomplish amazing things.

Intersections

The explosion of computer use has not just occurred in homes and business, but also in schools. Governments are spending billions of dollars every year in technology devoted to classrooms.[51] We are replacing traditional hands-on methods of education, like writing and drawing, with keyboard, mouse, and touchscreen. Neuroscientist Dr. Michael Merzenich (2010) is concerned that by ignoring the benefits of handwriting and drawing by hand, we are depriving our children of their possible amplifying neurological impacts on the development of semantic and ideational power. He states that:

> "I associate an aural word with an object or action; the written word adds to my
> reliable sorting of the MEANING of that word–with all of its associative
> extensions–in my mind. Producing (WRITING) it in cursive script adds again to
> the selectivity and reliability of my representation of the idea of that word. A
> pictograph of that word adds again. From the operations of my hand in cursive
> or in drawing, I CONSTRUCT that idea in its sound and visual parts. From
> ALL of these sources, I add to the richness of my associative elaboration of
> meaning associations An educator who uses a hands-OFF approach to learning
> (not formally involving much writing or drawing or manual skills development)
> is going to deprive the child from what can be powerfully amplifying
> neurological impacts on the development of semantic and ideational power!"
> (2010).

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[51] Fortune magazine anticipates that governments worldwide will spend 19 billion US dollars in technology dedicated to classrooms, and there is little evidence that these expenditures are really helping students (Koba, 2015, April 28).

Merzenich adds that the fine motor skills associated with handwriting and drawings are essential, as these activities train the brain's capacity for attention and focus. These are vital faculties necessary for understanding the underlying sound-meaning connection of language. For Merzenich as well as for Heuer, a keyboard and a computer screen change the sensorimotor skills in people, and these changes influence the way we learn (2016). Maryanne Wolf (2008), Director of the Center for Reading and Language Research at Tufts University, warns that young learners who use the internet extensively to access information might just become 'decoders of information' who have neither the time nor the motivation to think beyond whatever is displayed on the screen. She adds that our ability to write and read has given us an enormous opportunity to develop ourselves as the creators of many oral and written language cultures, and of expanding our knowledge and intelligence. (Wolf, p. 215) While we need to remain vigilant that we do not confuse easy access to volumes of information with personal understanding and knowledge, we also need to recognize that to fully participate in contemporary school, social, and work life one needs to become digital-media literate. The key for our educators, (meaning teachers, coaches, mentors, and others engaged in knowledge transfer) is how to balance what has worked best in the past with the potential benefits of new technologies.

Reexamining Literacy

In recent years education policy has pivoted to aggressively push for more class time dedicated to STEM (science, technology, engineering, mathematics). More money is being allocated to technical and scientific disciplines at the expense of social sciences, humanities, and arts education.[52] Yet most of society does not have specialized technical training, such that most

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[52] The school subjects of science, technology, engineering, and math are known as STEM education. The Guardian reported that "The focus on maths and science doesn't add up. The arts must be in the equation. (Brewin, K., 2016, December 9). Whereas President Obama stated on March 23, 2015, in reference to STEM education. "[Science] is more than a school subject, or the periodic table, or the properties of

of us cannot articulate (much less understand) how technologies work, meaning that we are restricted to the most superficial level of analysis of digital media. We also tend to assume that just because new generations will have grown up with the Internet,[53] they have the knowledge and skills to critically examine the content they consume. Literacy is not just about acquiring basic reading and writing skills, it is about being able to relate what we read and learn in textbooks and classrooms to life experiences, as Dewey argued (1964). The task of understanding what digital media is and how it works—in other words, becoming digital media literate—is for everyone, as more and more of the services we use and the information we consume is delivered using digital technology.

Mobile technology and Social Media companies have billions of users worldwide and have almost limitless potential for sharing/spreading information, just as they also have the potential to spread propaganda, advertisements, and in general terms 'noise' which make it more difficult to extract useful information. Most, if not all, the internet applications we use, such as Google, YouTube, Instagram, Facebook, and Wikipedia, provide data and information that require us to analyze critically what we see and what we read. Furthermore, since we are increasingly becoming producers of information as well as consumers, we concurrently need to learn how to best expose our information to others. As consumers of data, the fundamental questions we need to ask are: who created the content we are seeing? What techniques are the creators using to get our attention? For what purpose? Who could benefit from this message? Who is the audience? How would others interpret this message? Can I recognize any biases?[54] As producers, we need to ask similar questions and be concerned with the ever present

waves. It is an approach to the world, a critical way to understand and explore and engage with the world, and then have the capacity to change that world..." (Obama, Barak, 2015, March 23).
[53] Rushkoff and Prensky popularized the moniker "digital natives" for these generations.
[54] The following link is a video produced by The Center for Media Literacy on media literacy. https://www.youtube.com/watch?v=GIaRw5R6Da4. (Media Literacy Now, 2017, January 17).

possibility of contact with unintended audiences. Human Resources departments, for example, are checking social media accounts of applicants to see if they find anything that could be embarrassing for the applicant or the company.[55] Producers of online content need to be aware that it might not always be possible to delete something that has been posted.

In our daily routines, it is not difficult to observe the extent to which we are surrounded by images on computers, televisions, phones, billboards, among other media. It is therefore pertinent that we examine how information is understood and how knowledge is acquired through visual practices. Today, the illusion that text can represent the world and that the world can be represented by text is no longer appealing to a generation of new learners who are using text as just one of the many modes of gathering information (Lemke, 2006, p. 19). We need to examine images as both 'representation' and 'presentation' and explore how images can hold meaning and be used in knowledge building.

The Visual World

In the near future, the visual image might surpass text as the prominent carrier of meaning and information, and therefore of knowledge representation. One can argue that we are experiencing a transition from a culture dominated by 'text' to a culture dominated by the 'image' (including visual images, images with text, icons, emojis, emoticons, etc.). Theorists such us Susan Sontag[56] (1977), Martin Jay[57] (1996) and Marshall McLuhan (1964) have

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[55] A study by Career Builders reports that 70% of employers screen applicant's social media entries. (Driver, Saige, 2018, October 7).

[56] Sontag (1977) describes images, particularly photographs, as "a grammar and, even more importantly, an ethics of seeing. Finally, the most grandiose result of the photographic enterprise is to give us the sense that we can hold the whole world in our heads - as an anthology of images" (p.4).

observed that images are producing changes in our consciousness and psyche, that we are moving from a linear reasoning (sequential, structured, and orderly), to a pictorial reasoning (multi-directional, unstructured, and disorderly). This could have profound implications for pedagogy and impact our understanding of how knowledge might be acquired and shared.

In general terms, the purpose of acquiring information is to try to gain insight into new ideas or concepts. Visualization and visual analytics offer another path to make insightful observations of data and information. Don Norman (1994), director of The Design Lab, at the University of California, argues that the beauty of human reasoning is in our ability to find ways to overcome the constraints of our own minds. He wrote that:

> The power of the unaided mind is highly overrated. Without external aids, memory, thought, and reasoning are all constrained. But human intelligence is highly flexible and adaptable, superb at inventing procedures and objects that overcome its own limits. The real powers come from devising external aids: it is things that make us smart. (1994, p. 43)

Visualization gives the opportunity to represent data and concepts using images, and that such representation changes the nature of information presentation, comprehension, communication, and as a result could amplify cognitive abilities. There is a great deal of data in our contemporary world, and the amount and complexity of that data is becoming a problem for

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[57] For Martin Jay (1996 and 2002) fields of studies such as Visual Culture, are allowing us to learn to examine images more closely and on their own terms. He wrote that " insofar as we live in a culture whose technological advances abet the production and dissemination of such images at a hitherto unimagined level, it is necessary to focus on how they work and what they do, rather than move past them too quickly to the ideas they represent or the reality they purport to depict" (p. 88).

many organizations.[58] This data is not always of a quantitative nature, but also qualitative. One approach to deal with this challenge is to represent abstract concepts and qualitative data in a visual form that facilitates the detection of patterns and give rise to important insights.

Visual thinking has been recognized from the time of our early ancestors as a powerful way to convey ideas and concepts. We have records of paintings in caves that are thousands of years old, and philosophers such as Aristotle proclaimed that "without image, thinking is impossible" (325 BC). Artists throughout human history have used images to reflect on their life and culture. Over the last decades, the production of images has escalated significantly with the advent of technology that can be used to create, edit and share images. There is also wider recognition that 'thinking' itself is perceptual in nature and that attempts to separate the act of seeing from the act of thinking are misguided. Arheim, in his work 'Visual Thinking' asserts that images and visual perception lay the groundwork for concept creation. He adds that "the mind, reaching far beyond the stimuli received by the eyes directly and momentarily, operates with a vast range of imagery available through memory and organizes a total lifetime's experience into a system of visual concepts" (2004, p.249). The use of visualization,[59] to communicate concepts and to share experiences has a pertinent application in knowledge transfer and knowledge acquisition.

Several studies, including ones by Avgerinou (2009), O'Brien (2001), and Felten (2008), have concluded that the new generation of students spend a considerable amount of time using

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[58] According to a Gartner report from June 2011, when Information Managers begin to feel they are losing control of the access and qualification aspects of data, they may be tempted to focus on volume alone. http://www.gartner.com/newsroom/id/1731916 accessed on December 12, 2013.

[59] When I refer to visuality and visualization I make a distinction that vision is a mechanical process. I also employ the definition offered by Nelson (2000) that visuality is the social/psychological process of socially constructing meaning from our perceived visual data (definition quoted by Natharius. 2004. p. 239).

digital media technology to access whatever information they need for their school and entertainment. This information is predominant in images; therefore, Sutton and Brozo argue, it is critical to provide visual literacy education (2010, p. 526-528) since exposure to a constant flow of images does not necessarily mean that people have the skills to critically analyze and understand those images (Felten, 2008). Seeing and making sense of what we see is not a simple process. Mitchell (2005) describes the complexity of seeing by drawing a distinction between looking and deciphering meaning, decoding, interpreting, and partaking in spectatorship. His point is that if we have the physiology of working eyes, we can look, but, our ability to see and interpret is contingent in what our eyes have been trained to see and how our minds are primed to interpret. The idea of vision being socially constructed and culturally located, argues Jenks (1995), "both liberates and subsequently elevates the practicing 'see-er,' the human actor, from the status of the messenger of nature and into the status of the theoretician. In this way, sight becomes properly recognized as artful" (p. 10).

Words and ideas, such as form, colour, and beauty, are part of 'the vision skill' that we need to learn and practice, and visual literacy ought to be an essential aspect of our educational development, as is verbal and written literacy. Camille Paglia (2001) illustrates the thinking of vision as a skilled cultural practice by describing that beauty was made by men acting together:

How did beauty begin?
Earth-cult,
suppressing the eye,
locks man in the belly of mothers.
There is, I insist, nothing beautiful in nature.
Nature is a primal power, coarse and turbulent.
Beauty is our weapon against nature;
by it we make objects, given them limit, symmetry, proportion.

Beauty halts and freezes the melting flux of nature.

(The Birth of the Western Eye, p. 57).

Felten (2008) defines visual literacy as "the ability to understand, produce, and use culturally significant images, objects, and visible actions" (p. 60). Visual literacy is also a way to acknowledge the semiotics affordances of image,[60] to have the skills to engage in discourse with others through images, to stimulate creativity through imagination, and to help decipher the unknowns. Just like we have developed processes and rules for language communication (shapes of letters, grammar, and syntax to name a few) and are able to write simple to-do notes or complex academic papers, we need to, argue Schirato and Webb (2004), "learn how to produce and read the basic components of visual texts- point, line and plane" (p. 42). And as we make progress with our visual literacy skills, we will need to learn about the effects of "light, hue and colour saturation, tonal value, texture and scale, dimension and motion" (p. 42). Knowing these elements will give us the basic and necessary skills to read the visuals.

With the development of robust tools and techniques to create and manipulate images, it has become very relevant for people to acquire the necessary skills not only to comprehend visual artifacts but also to participate in the creation of images. In other words, we must become literate regarding visual media, and the first step is to expose the fallacy of popular notions such as, 'the camera never lies' or 'seeing is believing'. In an article about image manipulation, Bruce Goldfarb is quoted by Julianne Newton (2006) as writing,

> If the history of the printed image is any indication, the emergence of real-time digital
>
> video manipulation is troubling. Computers are a force for the democratization of global

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[60] Don Norman (1988) explains that perceived affordances are developed from a combination of what one sees and what one knows.

communication, and a powerful tool of propaganda. Sooner or later some clever person

will figure out how to game the system and make the public believe they witness

something on live television that never really happened (2006).

According to Paul Messaris, visual images are just another form of language (2012), and

any attempt to represent reality using images is as subjective as verbal statements. Messaris

exhorts us to become fluent in visual images via visual literacy training. He explains that the

main difference between text language and images is: the former uses symbols that are

completely arbitrary, while the latter connects its form to meaning via analogy. He adds that

"precisely because of the fact that visual conventions are modeled on real-world perceptual

processes, the persuasive and manipulative uses of images may be less easy to detect than verbal

persuasion or manipulation" (p. 103). The manipulation of images is anything but an Internet

phenomenon, movie makers and photographers have been doing it for years. What is different

today is the ease in which images can be altered and disseminated, and while this is a risk that we

must be aware of, visualization also provides creative opportunities to represent and share ideas

in ways that were heretofore unavailable. Gardner and Davis argue that we should be worried

about the funding cutbacks to art education (2013), while at the same time recognizing the many

exciting examples of creative expression displayed by young people in websites dedicated to art,

like Figment and deviantART, for example.

With the emergence of new technologies that blend text, images, and sound, the time has

come, according to Gunther Kress, to replace language at the core of literacy with multiple

modes of representation. A 'mode' is a socially shaped and culturally given semiotic resource for

making meaning (2010). To put it a different way, the dominance of the 'text' as the primary

means of acquiring meaning and knowledge needs to be replaced by the multimodal principle.

The multimodal principle proposes that meaning and knowledge are built and acquired using various modalities such as images, sound, metaphors, designs, text, symbols, etc. People today, particularly youth, are already making extensive use of various modes to express their ideas and share them with others (Gardner and Davis, 2013). Carmen Luke (2003) writes in a controversial article that the classroom is perhaps the only place where today's students are not "blending, mixing, and matching knowledge drawn from diverse textual sources and communication media" (p. 398). Avgerinou further argues the need to move from interpreting the world-as-a-text to the world-as-a-picture, and that "deconstructing and understanding the world in purely linguistic terms is neither satisfactory nor adequate any longer" (p. 28). While most of us might agree with the pervasiveness of visual media in our society, we also need to recognize the need to train and empower people to better comprehend the world of images. For B. M. Stafford, not enough attention has been given to the value of images and although we are drowning in electronically generated images, media critics have failed to recognize the "qualitative capability for information shaping knowledge" that images possess (1997, p. 124).

Written text will remain the primary mode of communication,[61] however, it is increasingly complemented by new sensory languages wherein images and sounds play a significant role in communication. We can expect profound changes in our engagement with the world and in the forms of data presentation, learning and understanding. As Kress writes, the "world told is a different world to the world shown" (2003, p. 1). The adoption of imaging technologies and the widespread use of digital devices to access images will likely have

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[61] Of course, written language will continue to be extremely useful in many circumstances, including government papers, laws, rules and regulations, some academic papers, etc.

cognitive and epistemological effects on individuals, and theories on learning, knowledge acquisition and knowledge dissemination need to reflect the impact of these new technologies.

Writing leans on the rules of speech and it is governed by the logic of time and of sequence. Images, on the other hand, are governed by the logics of space and simultaneity (Kress, 2003). To put it differently, in writing we must write one character after another and one word after another and follow grammatical rules in order to securely attach meaning to the text. In a visual representation, the placement of elements is related to the space of the work surface, whether it be a canvas, a wall, or a computer screen. Images can be placed on the centre, or the sides, up or below, and the positioning of elements might have specific meanings. The same way we cannot escape the logic of time when we use the verbal and written language, we cannot escape the logic of space when dealing with images. It is this world of the visual that offers us excellent opportunities for research and exploration.

Guernica[62]. Oil on canvas, 349 cm by 776 cm. Picasso, 1937.

Studying 'the visual' does not just include the analysis of visual artifacts or developing a 'good eye' to recognize different elements of an image. It is not also just recognizing good

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[62] Guernica is regarded as one of the most important anti-war visual representations.

design features or image manipulation. For example, if we want to understand Guernica, we need to look at the image from aesthetic, social, cultural, and cognitive perspectives since the way we organize our response to the world extends from what we already know based on previous learning and experience. Paul Messaris (1994) writes that visual literacy is a "prerequisite for the comprehension of visual media, general cognitive consequences of visual literacy, awareness of visual manipulation, and aesthetic appreciation (p. 3-4). To put it more succinctly, visual literacy has two aspects: the ability to understand visuals, and the ability to employ them. This means to think, learn, and communicate in terms of visuals. Natharius builds on Messaris and adds that "the more we know, the more we see" (2004, p. 241). He leans on intertextual analysis to suggest that the more knowledgeable we are with words, the more literate we are overall. Intertextuality refers to the cognitive connections we make when we see something and understand it by referring it to previous knowledge and experiences.

Another approach to tackling visual literacy is to look to multimodality. To understand multimodality, we need to consider the term 'mode' or 'modality' as a different aspect or form of communication. Pauwels (2006) identifies these modes as physiological and sensory channels such as seeing (the visual mode), hearing (auditory mode), touching (tactile mode or the haptic mode when considering as aspects of a device), tasting (gustatory mode), and smelling (olfactory mode) (2012, p. 250). Thus, if we are looking at a website, we can think of it as images, text, touch (via mouse and keyboard), and sounds. If we then engage in analysis that includes more than just the text, we are doing multimodality analysis. Within these modes, we can also identify sub-modes; for example, from within the visual mode we could have photography, film, and computer-generated graphics as sub-modes. Multimodality use and analysis demand an equal epistemological commitment. The expectations we have of 'text' to accurately represent our

ideas and thoughts should be the same as those of visual representation. Kress illustrates these expectations by providing the following example, if we write 'a plant cell has a nucleus,' we have indicated a relationship: a positional relationship between the cell and the nucleus, indicated by the word 'have.' If we were to draw a plant cell, then we should be expected to represent the nucleus in its proper place (2004).

Science has made use of images since the time of the Renaissance, particularly since the invention of the camera obscura. Ihde (2002) points out that a main cultural practice of science has been "to produce, display, and reiterate what counts for evidence in visual form" (p. 37). Science uses imagery extensively as a vehicle for representing objects, events, and/or bodies. For example, photographs from satellites are used in conjunction with mapping software to show us landscapes with a great deal of detail. Images representing clouds and winds are used to tell us about the weather. Images representing the inside of our bodies can depict internal organs and even miniscule differences in human tissue. These imagining technologies have made the invisible visible to us and in doing so have significantly influenced not only the way we think about images but about visual perception itself (Teffer, 2010, p. 173). Furthermore, these images have embedded information with specific meanings that are understood, at different levels, by the observers depending on their expertise.

Medical science widely uses x-ray, ultrasound, and scanned images to diagnose health conditions and propose treatments. In all these cases, we attribute meaning to things depicted through images of a world beyond the reach of the naked eye. Consider the ways in which technologies such as ultrasound use radio waves to access the inside of the body and produce an accurate representational image for assessment. By doing so, writes Teffer, "eyes are superseded by machines and what we can see is no longer restricted to light's visible spectrum. It would

appear then, that the century of light (20th century) has been well and truly eclipsed" (Teffer, p. 175). What Teffer argues is that light is no longer necessary to make things visible and that technologies based on sound waves, atomic interferences and radio frequencies are redefining the nature of visual representation and rendering the invisible visible. In this century, what was heretofore shrouded and obscured in the darkness beyond the reach of light is finally being revealed to the human eye.

Images have long been very important in scientific studies. Particularly, the use of diagrams "has a crucial part to play in scientific investigation" (Descartes as quoted by J. Trumbo, 2006, p 266). Trying to represent the inside of our bodies is not a new activity. Leonardo Da Vinci used drawing extensively to depict his anatomical studies (Figure 1 shows his study of the fetus in a womb). He also produced drawings of the vascular system and sex organs. The National Library of Medicine in the United States owns several hundred anatomical drawings from Persian and Arabic origins as well as from European scientists dating back from the sixth to the nineteenth centuries.[63] However, most of these drawings were illustrations made by human hands. Their sources were the careful observations of cadavers. The anatomical images produced today are made in real time by machines with an unprecedented amount of detail that can't be perceived by an unaided human eye. Figure 2 shows an ultrasound of a fetus and Figure 3 shows two fMRI of the brain.

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[63] The National Library of Medicine.
http://www.nlm.nih.gov/exhibition/historicalanatomies/a_persian_anatomies_bio.html access on December 22, 2013.
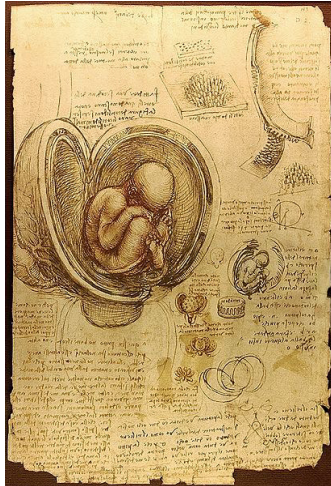
Figure 1. Da Vinci – Study of the fetus in a womb[64]

Figure 2 – Prenatal Ultrasound Scan[65]
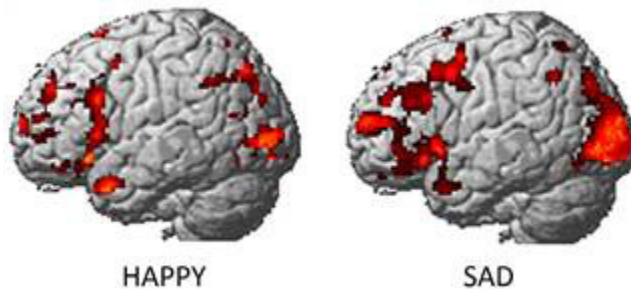
Figure 3. Brain scans show a person who is happy (left) and sad (right).[66]

Pauwels (2006) asserts that visual representations are essential elements of science and play a key role in scientific discourse. For example, medical diagrams are not just add-ons for illustrative purposes but serve multiple functions such as for diagnostics, training, and

[64] Image source: http://www.leonardo-da-vinci.net/embryo-in-the-womb/
Analysis by Gilson, Hilary, "Leonardo da Vinci's Embryological Drawings of the Fetus". *Embryo Project Encyclopedia* (2008-08-19). ISSN: 1940-5030 http://embryo.asu.edu/handle/10776/1929.
[65] Source:
http://assets.babycenter.com/ims/2012/10/iStock_000004701536Medium(2)_4x3.jpg?width=520
[66] Source: Carnegie Mellon University. Reported by: http://www.ccbi.cmu.edu/news/nbc6.19.13.html

knowledge creation. On the other hand, we need to be aware that although these images may resemble the real body, they are only approximations of physical actuality. As Stafford argues, medical doctors need to be cognizant of what constitutes an authentic representation of suffering patients (1996, p, 50-53). Scientists, doctors, technicians, and patients are increasingly relying on electronic images to make judgments on medical conditions, and we should be aware and recognize the limitations and biases of the observers in interpreting the images correctly, as well as the potential failures in the production of such images due to technical or technician error. As Ihde writes, the scientist "always remains a bodily perceiver" (2002, p. 48), and therefore, the interpretation of the images might not always be accurate. In a news report from April 12, 2018, the CBC stated[67] that at least 5 provinces had serious concerns about the quality of medical scans, and in Quebec, for example, thousands of scans had to be reviewed for diagnostic accuracy. Enquist (2013) outlines several gaps between doctors and patients when dealing with clinical images. These gaps could be a matter of information (how much information is adequate?), a matter of power (who controls the treatment?), or a matter of competency and skill (can we trust the production and interpretations of the images?). The interpretation of clinical images is a complicated process that can help tremendously as part of constructing a narrative of the health of a patient if it is done correctly, empathetically, and given that the parties understand the data.

Although scientific visualization has been used to bridge the gap between theory and practice, and scientific communities have widely adopted it, there is still a need for formal training in the visual cultures of science. Several researchers including Pauwels (2006), Roth, Bowen, and Masciotra (2002) have observed that most students are ill-prepared to perform

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[67] CBC News (April 12, 2012) *Medical scan mistakes: what's behind the problems?* Retrieved from: http://www.cbc.ca/news/canada/medical-scan-mistakes-what-s-behind-the-problems-1.1161747

scientific visual representations in a meaningful and skillful manner. This doesn't surprise Avgerinou, considering that a typical school curriculum on literacy usually fails to cover even elementary information on visual components such as point, line, shape, form, space, texture, light, colour, and motion (2009, p. 29). The lack of visual literacy training is worrisome given the prolific production and distribution of images. The assumption that more exposure to images will result in an increase in visual literacy and competency leaves us vulnerable to accept the authority of images without questioning the process of their creation.

While conducting an interview for this research, I asked one of the participants, who is a flight instructor, to explain to me what happened January 15, 2009, during US Airways Flight 1549 when Captain Chesley Sullenberger III successfully landed his plane on the Hudson River. Captain Sullenberger accomplished this after a catastrophic engine failure as a result of hitting a flock of Canada geese. Instead of just telling me his understanding of the event, Interviewee-seven brought up a video that simulated the takeoff, the impact of the birds on the engines, the maneuver to turn back the plane, and the landing on the river. The computer screen displayed the image of the cockpit, and in each of the four corners there were tables with different sets of data. The simulation also had the recordings of the actual radio transmissions between the plane, the airport controller, and other emergency services. The interviewee was able to explain to me in great detail what happened during the flight's tumultuous five minutes. He was able to pause the simulation video, bring other graphics in on separate computer screens, and use these to augment his commentary. It was quite obvious to me that he possesses a wealth of aviation knowledge, but the use of videos and graphics made it a lot easier for me to understand the circumstances that led the pilot to decide to land his plane on the Hudson River. And what a successful landing it was indeed – every passenger and crew member survived. The aviation industry has been using

simulation training for over one hundred years.[68] Simulation has played a key role for the design

and development of planes, as well as for the training of engineers and pilots. For example,

simulation gives NASA employees the opportunity to practice many control room procedures

and evaluate their readiness and efficiency during training exercises.[69]

J.P. Gee (2003, 2006) has done extensive work on video games as learning tools. He

argues that educators need to pay close attention to the design of successful commercial games to

understand how to create fun, exciting, and challenging lessons for students. Video games that

do not meet these criteria do not survive in the marketplace. For Gee, these companies are using

proven theories of learning and are embedding them into the design of their games. One of the

reasons for their success is that they make the learning enjoyable. This approach is consistent

with the findings of several cognitive science researchers who argue that the brain naturally

refuses to engage in difficult tasks in order to conserve resources unless motivated by the

prospect of pleasure and enjoyment, as well as a high probability of success (Hattie& Yates,

2013; Ritchhart, R, 2011). The benefits of using game design techniques to develop educational

curricula do not stop at furnishing information. The biggest payout might come by providing

bona fide 'experience' to the recipients. Although these experiences are of a virtual nature, the

brain is still able to store them and use them later in future situations. A key aspect of

understanding concepts and acquiring personal knowledge is to be able to connect new

information to other ideas and past experiences. The more we know and the more experiences we

have, the easier it is to make such connections and internalize new concepts.

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[68] During the First World War rudimentary simulators were built to train pilots on the use of air gunners.
Computers facilitated the spread of simulation techniques, which continue to get more and more
sophisticated.
[69] For additional information on the NASA simulation program see: *The Role of Aircraft Simulation in
Improving Flight Safety Through Control Training.*
https://www.nasa.gov/centers/dryden/pdf/88743main_H-2501.pdf

Game design makes use of analogies, metaphors, and storytelling which are methods that have been used for thousands of years because they provide a powerful means of constructing 'context' for data and information. "Storytelling tends to place information (e.g. activities, events, facts) within a commonly accepted contextual framework, often exploiting the qualities of internalization and socialization" (p. 16). says Vande Moere (2013). A story is frequently used to provide a series of facts and information, but the narrative of the story is what provides the context and the meaning of the facts which leads to internalization of knowledge. It is not surprising then that extensive research is underway on the use of video games based on storytelling for training and educational purposes.

Moving from Text Literacy to Digital Media Literacy

The production and consumption of images circulating on the Internet and viewed on televisions and digital devices will continue to grow.[70] With the overwhelming volume of information we are exposed to, there is also a renewed concern about the state of reading and writing among the so-called 'net-generation,' warns Stafford. The issue, he argues, is that the push for 'literacy' neglects 'the visual.' Images are still relegated, by most of the educational curriculum, to the periphery, as aids to the written text and as diagrams that convey information only from data and not from the image itself (2007). Treating visualizations as not only representations but also as presentations, with their unique power to hold and transfer knowledge on their own, provides a unique opportunity to go beyond 'text literacy.' This requires

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[70] YouTube's website reports that 100 hours of video are uploaded every minute to their site. http://www.youtube.com/yt/press/statistics.html accessed on December 27, 2013. Likewise, Flickr reports that their average daily upload is 1.4 million images. http://www.flickr.com/photos/franckmichel/6855169886/in/photostream/ accessed on December 27, 2013.

appropriate training in visual proficiency and the earlier we integrate it into the educational system the better prepared we will be to understand the visual world. Moreover, we need to take a more holistic approach to literacy education that involves all our senses and incorporates the myriad technologies available to us. A literature review, conducted by Suzanne Stokes (2001) on the impact of using visual elements in teaching and learning concludes that the use of such elements yields positive outcomes. However, for Kipp Bentley (2017) most teachers do not possess the skills necessary to effectively grapple with the nuances of digital media; therefore, guidance and instruction in digital media literacy for both teachers and students are warranted.

Recognizing the importance of media literacy requires approaches that are multidisciplinary in nature and combine history, arts, technology, cognition, communication, culture, and pedagogy. Barbara Maria Stafford writes, "true interdisciplinarity would be grounds in the acknowledgement that perception (aesthesis) is a significant form of knowledge (episteme), perhaps even the constitutive form" (1996, p 39). Interdisciplinary literacy will only be accomplished by a genuine collaboration between the humanities, arts and the sciences, coupled with the development of appropriate rules, properties, and techniques that can be taught and learned. The current educational system built on the written word needs to be complemented by a multimodal system that recognizes that images, sounds, and other modes can be effectively used to mediate meaning-making. Visual artists know that different colours and expressions can generate different emotions. While interviewing a well-known visual artist, interviewee-eight, he explained to me that part of his training was learning how to mix and employ different colours and brush strokes to portray specific meaning and emotions. There is a lot of information and affect one can convey in a painting, he explained, but it needs to be learned and practiced assiduously to be good at it. His passion was to represent hands, mostly hands at work. For this

artist, hands can tell stories of struggle, suffering or love. Musicians also know how to arrange

sounds in specific ways to induce specific emotional and intellectual reactions. However, even

basic levels of understanding of images and sounds are not common for most of us. A study

conducted by The Stanford University Graduate School of Education concludes that teens "may

be able to flit between Facebook and Twitter while simultaneously uploading a selfie to

Instagram and texting a friend. But when it comes to evaluating information that flows through

social media channels, they are easily duped" (Bentley, 2017, p. 1). The research showed the

students' overall lack of skills and understanding of how to find the sources for the information

they were viewing, and how to determine if those sources were credible and unbiased.

Interference: The Impact of Copyright Laws on Learning and Knowledge Sharing

The Internet has made it easier than ever to distribute data and information, which is very

positive for those who want to share knowledge but not so much for those who want to protect

information. Governments from around the world are revising their copyright laws in response to

pressure from big media companies and the American government, who claim that authors are

under attack from pirates and that creativity is doomed unless strict copyright laws are enacted

and enforced worldwide. At the same time, many scholars and critics of this type of

protectionism, including creators, feel that the current and proposed laws do not represent their

interests nor the interest of society in general. It is clear, writes Ian Angus, that "it is no longer

publicly available knowledge that is important, but privately owned and controlled innovation"

(2009, p.71).

The traditional approach to intellectual property (IP) rights has been to try to make them similar to the rights for tangible things such as land or natural resources, however, intellectual 'goods' are fundamentally different than physical goods. There are no limits to the consumption of intellectual goods. These are non-rivalrous resources and the more you use them, the better they might get (such is the case for computer programs). Therefore, one can argue that intellectual goods are very suitable to be 'public goods.' Academics and scientists have known for a long time that creative work is usually built upon the work of others. On the other hand, eliminating all intellectual property protections for authors might deprive those authors of a well-deserved livelihood. There are organizations, such as Creative Commons,[71] that are pushing back at overzealous intellectual property laws by establishing their own rules for licensing and sharing intellectual goods. In doing so, they are attempting to strike a balance between giving creators an opportunity to earn an income while also making their work widely available for the benefit of society in general.

The original Copyright Act of 1790 established the duration of copyright protection for 14 years (once renewable) in the United States. At that time, the thinking was that a master could teach an apprentice the craft (which was intellectual property) in 7 years. Therefore, the master could teach two generations of apprentices in 14 years. By the early twentieth-century in the United States, the patent was increased to seventeen years. In many cases, by the time the authorities got around to check patent infringements, the patents were already expired. These infringements were committed by pirates, particularly in the film industry. Lessig writes that if 'piracy' means using the creative property of others without their permission then, "the history of the content industry is a history of piracy" (Lessig, 2004, p. 53). The music and film industries

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[71] The Creative Commons organizations has more than 1 billion works that are licensed using its open access model. For more information, visit https://creativecommons.org/

were not the only ones engaged in piracy, the printing industry in the United States lobbied their government in the eighteen-hundreds to protect the work of American writers, but to allow the unfettered reproduction of any type of work from foreign writers (Hyde, 2010).

The copyright law enacted in 1790 in the U.S. refused to provide the same rights and protections to foreign authors. This was not an oversight but was intentionally designed to facilitate low-cost reprinting of foreign books, which contributed tremendously to the dissemination of reading in America (Murray, p. 24-25). Authors like Charles Dickens were celebrities in much the same way as movie stars are today. When Dickens visited the United States in 1842 he wrote to a friend: "I can give you no conception of my welcome, there never was a King or Emperor upon earth so cheered and followed by the crowds, and entertained at splendid balls and dinners and waited upon by public bodies of all kinds" (Postman, 1993, p. 39). American intellectuals of that time prioritized the spread of ideas and information over of the wealth of the authors, but only if the authors were foreign-born.

The original intention of patent and copyright protection was to provide limited exclusivity to creators, giving them the opportunity to benefit financially from their work while slowly moving it to the public domain. The use of copyright in England dates back to the sixteenth-century when a royal charter gave the printers in London perpetual rights to publish books (Hyde, 2010). This created a monopoly and many people saw this arrangement as a tool for repression. Milton described such arrangements made by "men who do labour in an honest profession to which learning is indebted" (Lessig, 2004, p. 89). By 1710, the British Parliament enacted the Statute of St-Anne to put a time limit to the exclusivity term. This did not stop the printers and booksellers from continuing to ask for an extension of the 21 years of exclusivity provided by Statute, even if the British Parliament rejected their lobbying and was eager to end

the monopolies. Lessig writes that "the idea that knowledge should be free was a hallmark of the time, and these powerful commercial interests were interfering with that idea." (2004, p. 89) The prevailing attitude towards copyright during that time was to favor the enrichment of culture over the financial interests of the creators. Regarding the Statute of St. Anne, Samuel Johnson wrote, as quoted by Hyde, that it was "for the general good of the world, therefore, whatever valuable work has once been created by an author, and issued by him, should be understood as no longer in his power, but as belonging to the publick; at the same time the author is entitled to an adequate reward. This he should have by an exclusive right to his work for a considerable number of years" (Hyde, p. 53).

Both the Statute of St-Anne and the US Constitution are examples of the utilitarian motives around patents and copyrights. Their long term-goal was the benefit of the public by promoting science and the arts (Murray, 2007). Today intellectual property right-holders' interests are placed above the public interest as the copyright term has been lengthened to author's life plus 70 years.[72]

Another fundamental concept related to our current IP debate is that of the 'commons.' The commons have traditionally been viewed as something that is shared and exists for the benefit of all. Moreover, it has been critical for individuals to be able to build upon the works of others by having access to their work.

In England, the process of enclosure[73] started in the eighteenth-century. There were many dispossessed rural groups that resisted the new practice[74] and responded with sabotage and

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[72] For additional information on US copyright law see: https://www.copyright.gov/circs/circ15a.pdf
[73] Enclosure is defined by Fairlie as "the subdivision and fencing of common land into individual plots which were allocated to those people deemed to have held rights to the land enclosed" (2009, p. 1)

public protest. The process of enclosure turned 'commoners' into 'laborers.' It is no coincidence that it took place just as the industrial revolution started to gain steam in British society (Hemmungs, 2006). The story of enclosure goes beyond the British borders, and there is a connection between enclosure in England and enclosure as part of the process of colonialism and imperialism. Hemmungs uses the Habermasian concept of the public sphere to explain that once we moved from an "economy of enough" (subsistence farming) to a capitalist mode of production, the access to the public sphere was restricted to the private individual, usually educated, who could afford to pay to be in these public houses – coffee houses, salons- to engage in public discussions. In many ways, this phenomenon is repeating itself in our Web 2.0 world, where the only way to engage in online community discussions is to join a social network group which means that you have to have the resources to pay for a computer and reliable access to the internet in order to become a regular member of that group.

Although we are in an information-driven society, little discussion has taken place around the characteristics of data, information, ideas, and knowledge. Intellectual goods are fundamentally different from physical goods and any attempt to enclose ideas must recognize this difference. Resources that are non-rivalrous, such as intellectual goods, are unaffected by consumption. For example, if I share an idea with someone, we both now have possession of that idea without any diminishing returns. This is particularly critical for scientists and creative people as they usually build upon the work of others. A good example is Walt Disney using the

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[74] For a comprehensive and useful essay on the history of enclosure in England see: "A Short History of Enclosure in England" by Simon Fairlie. http://www.thelandmagazine.org.uk/articles/short-history-enclosure-britain .

work of many writers and artists to build his characters and stories.[75] When people produce resources that are rivalrous we must then worry about whether there is an economic incentive to produce it, and also whether there is enough supply to satisfy demand. When a resource is rivalrous, a system is needed to promote creativity and control distribution so that it is not depleted or overused. On the contrary, when a resource is non-rivalrous, a system is needed to promote creativity but nothing else (Lessig, 2001, p.21, p. 95) In fact, writes Ostrom, "the more people who share useful knowledge (a nonrivalrous resource), the greater the common good" (2001, p. 5). We can observe this with many Open Source initiatives; the software that is created is constantly improved by others working on it for the benefit of all users.

One of the individuals I interviewed works for a large technology company that believes in 'open source' software. Companies and individuals that endorse open-source software make their source code completely available for others to study, change, use, and distribute to anyone and for any purpose. A key to the success of this company has been their ability to leverage the ideas of their employees and their users for the constant improvement of their software.

Proponents of copyright laws are not only lobbying their own governments to grant greater enclosure of information[76] but are heavy promoters of international treaties like the TRIPS agreement[77] which seeks to enforce a global infrastructure mechanism for copyright protection. On the other hand, we also find many developing countries claiming intellectual works as social products and not individual products. Some of these countries, for instance,

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[75] Kipling's book *The Jungle Book* was modified and used extensively by Walt Disney. The song "The Lion Sleeps Tonight" was appropriated without any compensation to the author, Salomon Linda (Hemmungs, 2008, p122-123).

[76] We must also keep in mind that the "owner" of Intellectual Property rights does not necessarily refer to the creator of that idea. The Disney Corporation owns the right to the Jungle Book movies, musical, characters, etc. but, the original Jungle Book story was created by Joseph Rudyard Kipling.

[77] TRIPS: Trade Related Aspects of Intellectual Property.

refuse to recognize any type of patents or private rights that have to do with plants, seeds, or human/animal bodies.[78]

To counter the restrictions imposed by current copyright and patent legislation, many scholars and others who recognize the importance of shared information for creativity, innovation, and democracy are pushing for the public and governments to regard information as a 'common' resource. Yochai Benkler, Professor at Harvard Law School, writes that our society needs "an open, free, flat, peer-to-peer network that serves the ability of any one –individual, small group, or large group- to come together to build our information environment. It is through such open and equal participation that we will best secure robust democratic discourse and individual expressive freedom" (Kranich, 2004, p.13 quoting Benkler).

In 2001, the Creative Common organization was founded in the United States to allow creators to share their work under a Creative Commons licensing agreement. It allows the authors to give the public permission to share and use their work with conditions imposed by the author and not by media companies. It moves the default wording of 'all rights reserved' to 'some rights reserved.'[79] Creators interested in sharing their work and allowing others to build upon their ideas are now able to do so under a Creative Common license. This does not mean their work can't be used for commercial purposes, it only means that the creator has greater control over how his/her ideas can and cannot be used.

The emergence of the Internet was an incredible accomplishment of collaboration and knowledge sharing. It made the idea of universal access to information and research a real possibility, where people from all countries could finally gain access to leading scientists and

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[78] The government of Ecuador has changed its constitution to protect anything related to nature to be free of patents.
[79] See Creative Commons website http://creativecommons.org.

professors from anywhere in the world. But the legal systems, mostly in Western nations, and the influence of big companies (whose financial priorities far outweigh any type of social objectives) do not allow for universal access to become a reality. On November 21, 2017, the New York Times[80] and many other news organizations reported that The Federal Communications Commission repealed the rules of Net Neutrality, which heretofore prohibited internet service providers from stopping or slowing down the delivery of websites. These new rules will make the telecom giants the de-facto gatekeepers of information.

At the present moment, every type of 'fair use' regulation appears to be under attack, and any idea introduced by a piece of work entering the public domain appears to be fading under the extreme time allowances imposed by current IP laws. Companies like Disney who have clearly and directly benefited from the works and creativity of others are now locking down their products and not allowing anyone, anywhere in the world to use their material for any purpose which has not been explicitly sanctioned by the corporation. "Disney" writes Hemmungs, is "on one hand the killer of creativity, and on the other hand, the very embodiment of it" (2006, p. 286).

As technology advances and more people become aware of the value of sharing and contributing to the "Commons" (Knowledge Commons), there is some guarded optimism that the dream of universal access to information is not yet lost. Knowledge as an integral part of the commons provides a coherent alternative model for bringing economic, social, and ethical concerns into greater alignment (Bollier, 2011, p. 28-29). It allows us to evaluate our information resources outside of a market-driven model using a more qualitative and humanistic set of criteria such as moral legitimacy, social consensus, social equity, sustainability, etc. (Ostrom,

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[80] F.C.C. Plans Net Neutrality Repeal in a Victory for Telecoms.
   https://www.nytimes.com/2017/11/21/technology/fcc-net-neutrality.html.

Bollier, 2011, p. 29). Many academics are now participating in user communities, such as

Creative Commons,[81] which allow them to have direct control over the types of license

agreements that apply to their work, including the choice to apply full open access as a way to

achieve the widest possible distribution of their work. Nancy Kranich summarizes that "digital

age information-sharing initiatives allow scholars to reclaim their intellectual assets and fulfill

critical roles – the advancement of knowledge, innovation, and creativity through democratic

participation in the free and open creation and exchange of ideas" (2004, p. 93).

The Internet, as we know it, is barely three decades old; yet laws have not been able to

keep up with the constant changes in technology. Currently, there are many issues surrounding

information that are in desperate need of resolution, such as: who is responsible for the

preservation of digital information and resources for future generations? The challenge for

ourselves and our institutions is to make certain that society can continue to tap into the

unlimited human capacity of creativity and to ensure the promotion of innovation in all its forms.

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[81] Creative Common licenses are the response to restrictive copyright laws and embraced by some American legal scholars, that reflects the convergence of thinking about the public domain with emerging digital practices (Douieihi).
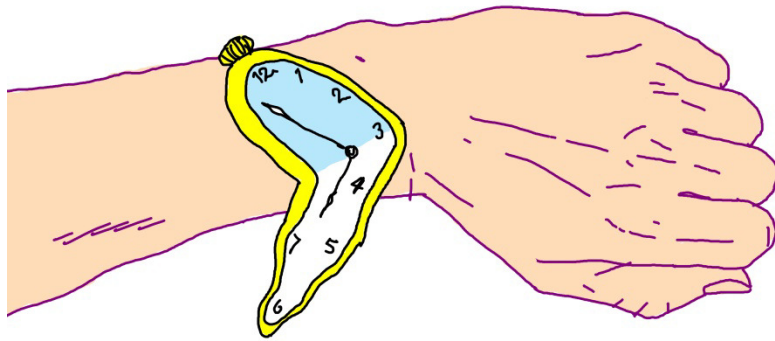
Reclaiming Time

Alejandro Salas-Strus. 2018

Reclaiming Time

Time passes slowly up here in the mountain
We sit beside the bridges and walk beside the fountains
Catch the wild fishes that float through the stream
Time passes slowly when you are lost in a dream.

Ain't no reason to go in a wagon to town
Ain't no reason to go to the fair
Ain't no reason to go up, ain't no reason to go down
Ain't no reason to go anywhere.

"Time Passes Slowly". Bob Dylan (1999).

Humanity has a long history of creating tools to measure, divide, and coordinate time for all kinds of purposes; from religion to transportation to war. Since industrialization took hold in the Western world and we began to measure productivity—first by the hour and then by the minute—we have been living under the constant vigilance of calendars and clocks. The cyclical nature of the calendar combined with numerical time-keeping help us organize time in our daily lives. John Durham Peters asserts, we cannot "defy the clock's incessant beat" (2008, p.10) if we want to participate in the modern world. We are brought up to respect punctuality. Our society demands we pay attention to calendars and clocks to find out essential information like government sanctioned holidays, the hour of the day to begin and end work, the time-schedule to catch a train, etc. We have access to hundreds of calendars and time-keeping software applications for our computers and smartphones which promise to help organize our tasks, simplify our lives, increase productivity, improve our social and family lives, and improve our health to name just a few. There are software calendars that are very personal with functions to help 'fitness and training calendars, 'fertility tracking calendars', and cancer treatment

calendars.[82] There are calendars that are 'countdowns' to events like Christmas,[83] and some that have 'weather reports to plan for optimal fishing.'[84]

Calendars have a rich cultural, political and religious history; the almanac was produced before the Bible when the first printing press became operational. Every major world religion has its own calendar, which are as sacred as their scriptures. In Christianity, there are several calendars still in use and as a result, Christmas and Easter are celebrated on different dates by different Christian groups. Ethiopia celebrated the new millennium seven and a half years behind the West because they use the Coptic Orthodox Church calendar. Ethiopians use two calendars now, their own Coptic calendar, and the Gregorian calendar. The most common calendar in use today is the Gregorian calendar which was implemented in 1582 by Pope Gregory XIII. The adoption of this calendar around the world was a slow process that took over 300 years. Tukey adopted the Gregorian calendar on January 1, 1927.

Some calendars have interesting political histories. For example, in 1793, France switched to the French Republican Calendar and to French Revolutionary Time, creating a decimal system of time. A day had 10 hours, 100 minutes per hour, and 100 seconds per minute. Noon was at 5 o'clock. Months were divided into three 10-day weeks, and there were 12 months.

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[82] To take this point further – the information in these calendars could enable very targeted advertising, or profiling, or tracking calendar users. In one example, the fitness tracker app "Strava" was revealed to have made public the maps of running routes which users generated, which in turn exposed the location of secret American military facilities. Reported by The Guardian. https://www.theguardian.com/world/2018/jan/28/fitness-tracking-app-gives-away-location-of-secret-us-army-bases

[83] The Guardian newspaper in the UK reported in 2017 that one could buy advent calendars filled with treats, from expensive candles and perfume to miniature bottles of prosecco or chunks of cheese. People might spend £175 on a calendar filled with mini beauty products, and others up to £10,000 on a calendar filled with rare whiskey. Reported by The Guardian. https://www.theguardian.com/lifeandstyle/2017/nov/16/ridiculous-rise-luxury-advent-calendars-500-pound-beauty-boxes-pork-scratchings-christmas.

[84] Bassmaster.com offers to assist anglers with lunar period calendars for planning fishing trips. https://www.bassmaster.com/best-fishing-times-fishing-calendars.

The remaining days needed to add up to 365 or 366 for the year were tacked onto the end of the calendar as government mandated holidays. The French decimal system of time lasted about a year and a half, and the calendar was used for a decade before returning to the Gregorian calendar. The French were not the only ones to have a revolutionary calendar. In 1929, the Soviet Union introduced to its population the Soviet Revolutionary Calendar. This calendar kept the Gregorian year as their existing calendar, but changed the weeks of the year, reducing the number of days from seven to five and increasing the number of weeks from the usual four to six. Each day on the calendar was represented with either a colour or a Roman numeral. All workers were issued a number or color which they had to use to find out if they were working or not. The idea behind the changes was to increase productivity in their factories and to try to eliminate the dominant religious calendar. None of those goals were attained and the country abandoned that system by 1940.

Many ancient civilizations from around the world invented different and ingenious methods of keeping track of time. However, it was not until the modern mechanical clock was invented in the seventeenth-century, and the need to coordinate railway time was indispensable to the British economy of the eighteenth-century, that the obsession with accurate timekeeping began. Clocks and calendars not only report times and dates, but they measure and control time, reducing it to predictable cycles, intervals, and numbers. Once we attached numbers to time, we are then able to set an exchange value for it, which can be expressed in terms of currency. However, some human affairs are not always predictable or measurable.[85] Gabriel Garcia

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[85] It is not uncommon in the human experience to feel that some weeks seem to go by in a rush, while others seem to drag on. Many of us feel cheated when clocks move forward an hour during March and pleased when clocks move back an hour in the fall. A study conducted by Valtteri Arstila (2012), of the Department of Behavioral Since at the University of Turku, stated that when people who have survived accidents report everything appearing to happen in slow motion it is because "our cognitive processes become rapidly enhanced. As a result, the relation between the temporal properties of events in the

Marquez tells a story about writing a controversial newspaper article in the ninety-fifties that infuriated the dictatorship in his native Colombia, after which he was asked to go to Geneva for a few days. He called his mother and told her that he would be away for a couple of weeks. It turned out that Marquez was not to return home for a couple of years due to potential persecution by the government. When some of his detractors told his mother that her deceitful son had forgotten about her and Colombia, his mother simply replied "Gabito is not deceiving anyone, but sometimes it happens that even God needs to make weeks that are two years long" (2003, p. 481).

Learning is also one of those human affairs that it is not very predictable, considering that the time it takes to learn and understand something varies greatly between individuals. The American State Department, for example, provides foreign-service employees with language-difficulty ratings, prescribing time periods required by students to learn various languages; these are always given as a range, appreciating that there is no guarantee a person can learn Spanish in 6 months, for example. For psychologists C.S. Green and D. Bavelier (2008), two key determinants of learning and knowledge-transfer are the motivation and arousal of the learner. These two factors are different for each individual and affect the amount of learning a person can do and the length of time a person may need to develop a skill. The more motivation and arousal an individual experiences, the greater the amounts of learning she acquires (2008, p. 9-10).

We are taught as children by our parents and teachers, and later by supervisors and employers, how important it is to keep track of dates and to be on time for school and/or work. Thanks to clocks, watches, and smartphones, the entire world can now keep track of accurate dates and times, all synchronized to atomic clocks. This chapter will examine the obsession of

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external world and in internal states becomes distorted with the consequence of external world appearing to slow down. That is, that sometimes people really do have experiences of time slowing down" (p.1).

institutions and companies to generate short-term results; even it means ignoring the length of time it should take to achieve positive and sustainable long-term results. It will then explore our socio-cultural penchant for quick decision making, often ignoring potential pitfalls by not taking the time to thoroughly examine the decisions that need to be made. Lastly, this chapter will look at the need to take the time to engage in deep-thinking and in deliberate practice and demonstrate how necessary these are for learning and acquiring skills at an expert level.

Short-termism: The drive for short-term results

When we hear 'time is money' we are reminded that we shouldn't waste any time in activities that don't produce rewards, particularly financial rewards. The colloquialism 'time is money' is attributed to Benjamin Franklin, who in 1748 wrote that we need to "remember that time is money. He that idly loses five shillings' worth of time loses five shillings and might as prudently throw five shillings into the sea."[86] The message is clear: constant labour that produces earnings is a personal virtue to be pursued. 'Time is money' is not only a colloquialism but a conceptual metaphor that imprints itself on our way of thinking, way of living, and the way our whole society is organized. In industrial societies, date and time-keeping systems became hegemonic, initially at workplaces and then at schools and home. This transition of keeping track of tasks in the context of time-duration and value coincides with the Puritan work ethic that was steadily spreading through Europe and North America. Productive-profitable-time is an end in itself and, as Max Weber articulated, it means that "man is dominated by the making of money, by acquisition as the ultimate purpose of his life" (1905, p. 18). For Payne, Bettman and Luce

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[86] Max Weber quotes Benjamin Franklin in his book *The Protestant Ethic and the Spirit of Capitalism*, dated 1905. http://www.stephenhicks.org/wp-content/uploads/2015/09/WeberM-The-Protestant-Ethic-and-the-Spirit-of-Capitalism-excerpt.pdf. Accessed on November 15, 2017.

(1996) the thinking of 'time is money' has resulted in the creation of high-velocity environments that are driven by rapid changes in technology, a drive to constantly increase outputs, as well as by expectations for quick results. Organizations operate under time pressure to deliver fast and profitable products or services, and often do so with little consideration for the long-term sustainability of such organizations, the well-being of their employees, or their impact on society. The tenure for executives in North America is not very long, and their compensation is usually linked to short-term results and profits[87] which is not conducive to long-term strategic plans.

Most publicly traded companies report results on a quarterly basis and are under relentless demands from shareholders to show positive outcomes even if it means neglecting long-term goals, which are ironically often part of their mission statements. We praise individuals who can deliver quick profits for shareholders only to find out later that their decisions were wrong-headed, selfish, unsustainable, and in some cases illegal. Take the case of Albert J. Dunlap, formerly a celebrated and sought-after corporate executive with a reputation for implementing radical changes that were supposed to turn struggling companies into profitable companies in a short period of time. His book *Mean Business: How I Save Bad Companies and Make Good Companies Great* (1996) became a best seller. He was invited to speak at the University of Chicago School Of Business where he boasted about the pleasure that he took in firing people and laughed about it in front of over 400 students (Pfeffer and Sutton, 2000, p 109-112). His approach was a two-pronged strategy: to fire a lot of people and to humiliate and instill fear in the remaining employees. By the late 1990s, it was clear that Dunlap's strategy might

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[87] The Wall Street Journal reported in 2017 that the average CIO tenure across industries is 4.3 years. CEOs average 8 years, and CFOs, stay 5.1 years. https://blogs.wsj.com/cio/2017/02/15/cio-stats-length-of-cio-tenure-varies-by-industry/.

have created short-term gains in the stock prices of the companies he worked at but were ultimately unsustainable over the long-term. According to the New York Times, the short-term positive outcomes he achieved for one company were the result of false accounting which led to the company declaring bankruptcy and shareholders losing everything.[88] Only Dunlap and a few other people have ever benefited from his approach and practices. While CEOs like Dunlap are not the norm, 'tough and hard-nosed' bosses are still admired by stock analyst and business reporters (Pfeffer and Sutton, 2000). These individuals rule by fear and punishment and create environments that make it very difficult to think and plan for the long-term.

When people are forced to work under constantly stressful conditions, it is reasonable to expect employees to be biased about selecting information that fits short-term goals, and to spend less time analyzing data or considering different long-term alternatives that might be more beneficial. Time pressure and quarterly reports, of course, cannot be the only reasons why companies risk their long-term financial viability, but an obsession with short-term metrics builds a culture and instills institutional practices which are structured around this short calendar. It should not come as a surprise then, that when our organizations only plan (and reward employees) for the next 6 months, few thoughts or resources are directed to planning for the next 10 or 20 years, much less the next 100.[89] While this fascination with 'fast' results might provide short-term satisfaction and profits, it sets us up for significant negative repercussions when we do not carefully consider the implications of our decisions over the long-term. The recent 2008 financial crisis is a case in point.

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[88] At Sunbeam Big Guys Won, Public Lost. May 20, 2005. Retrieved from: https://www.nytimes.com/2005/05/20/business/at-sunbeam-big-guys-won-public-lost.html.
[89] While it might be difficult for most of us to engage in planning beyond a few years into the future, it might serve us well to learn from the Iroquois who considered the impact of their decisions as much as seven generations ahead (Bateman and Barry, 2012, p. 986).

In 2008 the Western world experienced the worst financial crisis since the Great Depression of the 1930s. Government institutions from around the world were forced to intervene aggressively to prevent the entire banking system from collapsing. These governments had to allocate trillions of dollars to minimize the impact of the global financial crisis. The U.S. Federal Reserve submitted a bail-out package worth 700 billion US dollars, which was unprecedented in the history of the United States—or any other country for that matter. Despite all those efforts, housing prices plummeted more than 30% in the United States, unemployment reached 10%, and as many as 10 million American families found themselves without homes and at the mercy of their declining pension plans. The long-term effects remain difficult to fully calculate, but there have been several studies conducted to locate the source of the problem(s) and identify the decisions by government institutions and by the private sector that led to the financial crisis of 2008 (Erkens, Hung, Matos, 2012; French, Leyshon, Thrift, 2009; Campello, Graham, Harvey, 2010). One element which has been clearly identified is that the people who created the financial instruments, that Warren Buffett famously called 'weapons of financial mass destruction' and triggered the collapse of several financial institutions, were driven by short-term profit motivation and held a complete disregard for sustainability.[90]

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[90] The magazine The Economist described the financial instruments that caused the collapse as irresponsible loans that were doled out to 'subprime' borrowers with poor credit histories who struggled to repay them. These risky mortgages were passed on to financial engineers at the big banks, who turned them into supposedly low-risk securities by putting large numbers of them together in pools that did nothing to avoid the risk of a deterioration in the American housing market. In other words, these financial instruments were not designed to sustain any type of negative long-term conditions in the market. The result was a complete collapse of the value of these financial instruments.. https://www.economist.com/news/schoolsbrief/21584534-effects-financial-crisis-are-still-being-felt-five-years-article.

In a speech delivered by Sheila Bair,[91] the Chairman of the Federal Deposit Insurance

Corporation during the time of the 2008-2009 recession, it is acknowledged that there were many

causes of the financial crisis but the main culprit was the mentality of short-termism. Blair stated,

"short-termism is a serious and growing problem in both business and government" (2010, p. 1).

The pervasiveness of short-termism led lenders to make high-risk loans, and led all those

involved in selling and buying these securities to participate in such risky financial markets.

Everyone who participated in this marketplace were so concerned with short-term gains, they

were blinded to the warning signs. Bair stated that the managers of these financial companies

were allowed to "book short-term profits while ignoring the build-up of tail-risk inherent in the

complex mortgage instruments they held" (p. 3) meaning that if something went wrong in the

financial markets, those instruments could be worthless. She argues that the government's

response might feel "good for a while but does nothing to enhance the long-term performance of

our economy" (p. 4) and certainly, it does not protect consumers in the long-run. Bair is not the

only one to find a serious issue with this short-term approach. L. Dallas, a law professor at the

J.D. Harvard Law School, argues that prior to the crisis many market participants engaged in

myopic behavior that were short-term driven while at the same time ignoring long-term

consequences. The profits earned during this period "proved to be illusionary except for those

market participants who were highly compensated during the bubble," (2012, p. 267) and, as we

know from previous experiences, economic bubbles burst sooner or later leaving the creators of

the bubble wealthy and everyone else picking up the pieces. Put in a different way, the business

approach of those involved was based on the prioritization of fast quarterly profits over all else

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[91] Statement of Sheila C. Bair, Chairman, Federal Deposit Insurance Corporation on the Causes and
Current State of the Financial Crisis before the Financial Crisis Inquiry Commission; Room 1100,
Longworth House Office Building. January 14, 2010.
https://www.fdic.gov/news/news/speeches/chairman/spjan1410.html. Accessed on December 14, 2017.

and a repudiation of anything to do with the long-term sustainability of their companies or their clients.

The pressure for publicly listed companies to continuously deliver short-term profits appears to intensify over time and the penalties for not reaching these unrealistic high expectations can be significant. In 2005 the CEO of Xerox, Anne Mulcahy, complained that the pressure for short-term profit "was a huge problem" (Guilarducci, 2015, p 2) and it was getting in the way of responsibly operating the company with a long-term vision because the focus for the organization became showing ongoing positive quarterly results (Guilarducci). Paul Polman, CEO of Unilever, in an interview with Alana Semuels (2016), a staff writer for The Atlantic, comments that a management style that makes quarterly financial reporting the overriding goal is not a good strategy for long-term sustainability. Polman is concerned that "too many CEOs play the quarterly game and manage their business accordingly" (p.1) and that type of management is not what society needs when trying to solve big problems. A challenge, such as ensuring that a business will be viable for generations to come, requires a long-term mindset and can't be addressed if one can only think about one fiscal quarter at a time. In a 2005 study of 421 publicly traded American companies conducted by Graham, Harvey, and Rajgopal, the authors stated that most executives are willing to sacrifice "long-term value to avoid short-term turmoil" (p. 3), and that company managers are finding it increasingly difficult to think of long-term consequences under current financial market pressures (and its overreactions) to deliver on quarter's ending expectations. It is clear, for Polman, Semuels reports, that we have a growing corporate culture which promotes the obsession with quarterly results to the point that they possibly even engage in financial manipulation at the expense of long-term performance that could benefit the company, its investors, and society as a whole (2016).

Short-term thinking has impacted most organizations and industries. There is fear that if you are not first to market,[92] or first to break news,[93] or first to offer a faster solution to a given problem, no one will care what you have to say or what you have to offer. This creates a fertile environment for individuals and organizations to do whatever it takes to speed up processes and be first on the market. We have seen examples of news organizations that didn't take the time to properly research and confirm facts before they went public with a story only to acknowledge later they made a mistake. At present, Twitter is widely recognized as being the best source for breaking news.[94] However, this platform has constraints that make it difficult, if not impossible, to provide appropriate news coverage that is delivered together with verified information and careful analysis. The shortened work cycle to release news means that there is no time confirm reports or to perform thorough investigations to substantiate and to provide context for such news. It doesn't appear to be a cause for concern for many news organizations, as long as the reports are delivered faster and they are the first to do it. Newspapers and television stations are not the only ones to rush to Twitter to be the first to break the news, without taking the time to ensure accuracy.[95] In a recent event in Toronto, the city police department used their Twitter account to announce that an 11-year-old school girl was a victim of a hate crime which took

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[92] In business, being first to market is referred to as First Mover Advantage. According to this theory, companies that move first into a market are usually able to capture a significant market share, control resources, and become more profitable.

[93] Before 1858, when telegraph cables were laid down on the bottom of the Atlantic Ocean, it took over ten days for news that originated in Europe to reach North America. The telegraph reduced that cycle to seconds, but only between the person sending the message and the one receiving it. Today, Wikipedia Live Monitor, monitors breaking news from hundreds of sites and reports them in milliseconds to anyone with access to the internet. http://wikipedia-live-monitor.herokuapp.com/.

[94] Twitter appears to be the preferred method for the current U.S. President to address the people of the United States. All major government offices, minor government offices, politicians, companies, not-for-profit organizations, and even business professionals have Twitter and consider it necessary as a communication tool to reach their constituents or to build their brand.

[95] In 2013, CNN rushed to report that the Obama Health Care bill had been defeated in Congress only to retract that report later. In the same year CNN, the Associated Press, FoxNews.com and the *Boston Globe* were forced to backtrack on reports about the Boston Marathon Bombing. In 2017 CBS news reported that Tom Petty died 7 hours before his actual death, later on, CBS apologize.

place near her elementary school. Before the police did a proper investigation, they used social

media to send the message, they called a press conference, and as a result, most of the local press

reported this ugly incident. A couple of days later, after a proper investigation, the police

department concluded that the school-girl had made up the entire story. The problem is not

organizations using social media tools; the problem is the willingness to cut corners and cut the

necessary time to ensure information is not fabricated. A December 2016 study conducted by the

Pew Research Centre for Journalism and Media[96] in the United States showed that 14% of

individuals shared fake news stories with their friends using social media platforms which they

knew were not real. Fake news and propaganda have been used for a long time, mainly by

authoritarian and imperialists regimes;[97] however, what is new today is how quickly

misinformation can spread over the Internet and the eagerness of consumers to stay abreast of

events as soon as possible, no matter what the source. As news organizations embrace Twitter,

Facebook, and Instagram, and work with fluid deadlines, they are also confronted with the

challenge to report on these platforms constantly in a 24 hour news-cycle, with engaging

taglines, and shorter stories to be able to capture clicks from their audience.[98] Widholm (2016)

writes that online journalists have adopted a strategy to publish-first-and-update-later, and in

doing so, they might be losing sight of their responsibility to report as accurately as possible, and

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[96] Pew Research Centre – Journalism and Media. 2016. *Many Americans Believe Fake News is Sowing Confusion*. http://www.journalism.org/2016/12/15/many-americans-believe-fake-news-is-sowing-confusion/. Accessed on January 17, 2018.

[97] During World War I, governments had departments such as The British Ministry for Information, the American Committee for Public Information, and the German Image and Film Office, all had mandates to influence public opinion towards the war using posters, news articles, and film. The same strategy has been repeated in every conflict by opposing sides. For example, when I was growing up in Latin America we had at least three sources of propaganda: the first one was Radio America, a radio station dedicated to the promotion of American values and the disseminate of negative information about the Soviet Union, the second source was dictatorship-controlled television stations, and the third source was the magazines and pamphlets sponsored by the Soviets with targeted propaganda against capitalism and pro-soviet style communism.

[98] Getting and capturing clicks on websites allow these companies to sell such clicks to advertisers and generate revenue.

to provide appropriate context so that readers can make proper sense of the news. Reporting verified news and writing thoughtful analysis takes time; and time, it appears, is something we are not willing to take as producers or consumers of news.

News organizations are not the only ones trying to reduce the time it takes to make products and services available to consumers regardless of the potential negative consequences of short-cutting the processes. Peter Doshi (2017), from the University of Maryland School of Pharmacy, describes that for the last few decades, drug companies have complained about the amount of time it takes for the Food and Drug Administration (FDA) of the United States to approve drugs for sale to the public. The FDA has continued to insist that the long test-cycles required to do such testing are necessary and prudence is in the best interest of society. It should not then surprise us that when the current American administration released plans to 'speed up' drugs to the market, the FDA responded with a forceful defense of its current practice. For the agency, the bottom line is that appropriate testing necessitates several phases, and each phase takes a minimum length of time to execute according to pre-defined standards. Furthermore, the FDA argues that trying to cut time by eliminating the phase known as 'phase III clinical trials' does not provide the "required evidence of efficacy specifically in order to evaluate safety" (Doshi, 2017, p.1-2). But those arguments appear to have fallen on deaf ears, since it appears that the United States Trump administration is committed to implementing a quick process to get the drugs to market.

Short-termism can create the type of mindset that makes organizations believe that anything, including learning and acquiring expertise, can be accomplished rapidly, and as a result, these organizations are unwilling to invest on initiatives such as apprenticeships, coaching and mentoring, because it takes time to see benefits. I interviewed a senior executive who had

just recently retired after spending more than 30 years with the same institution (interviewee-eleven). The organization knew for a few years that this senior executive and many others like him were going to retire but had no long-term procedures in place to try to pass on their accumulated knowledge and experience to others. The assumption was that written documentation and a few weeks of training (which is short-term thinking) would suffice for successfully accomplishing knowledge-transfer, but many years of experiential knowledge cannot be transferred so easily and not in so few weeks or even a few months. Another executive I met with (interviewee-six), had a similar story. He told me that when he and others retired, the company did not spend any time or resources trying to get other employees to learn from experienced people. In some ways, he said, their refusal to spend any time or resources on tasks that do not produce immediate results demonstrates how little value organizations put on experience and knowledge. Interviewee-five also told me about a colleague who had recently retired and felt similarly un-appreciated when the institution she worked for did not assign her any time to train her replacement before leaving a senior-level position. He added that he was certain the new person(s) was left to try to reinvent the wheel on their own, just because the organization didn't want to take time to let them learn from their predecessor before her departure.

Biases for short-term decisions and feeling busy

Most of us share, to one degree or another, the tendency to ignore having to think about events that might occur later in life. It feels more comfortable to deal with the present than to consider decisions that could have consequences years in the future, even if those decisions might benefit us personally or might benefit future generations. It appears there are always more

immediate priorities which our mind wants to deal with than bothering with long-term thinking. The preference for short-term thinking likely explains why we tend to procrastinate, defer decisions to future dates, and why we are less likely to support initiatives that are long-term in scale, even when those initiatives make sense. To make things even more challenging, we are now surrounded by convenient technologies and tools that encourage us to expect immediate responses to our requests and reinforce a short-term-thinking mindset. If we need to find information, all we have to do is google it. If we need to change plans with a friend at the last minute, a quick text message is sufficient to update the friend instantaneously. If we want to buy an item at midnight, there is no need to wait for a store to open the next day because we can shop online 24 hours a day, 365 days a year. It seems instant response and convenience win every time, and we are getting so used to immediate replies that when something takes time, we become frustrated and tend to disengage very quickly. According to a BBC report, over half of us are not willing to wait more than 2.5 seconds before abandoning a website because 'it is too slow to load.'[99] The insistence on fast responses encourages us to engage in activities such as skimming through information instead of reading in-depth, reading summaries instead of details, and moving between tasks quickly to avoid silence and boredom.

For Kahneman, our tendency to favour actions that are short-term driven is biological. The areas of the brain which are designed to engage in careful calculations and deep-thinking, (in other words, activities that take time and effort) are much more energy-costly than other parts of the brain which are responsible for quick decision making, and which spend less energy to engage. Therefore, we have a biological bias towards relying on these easier systems, which Kahneman calls "System 1", to provide quick answers with minimal effort and no sense of voluntary control (2011, p. 20). System 1 makes a lot of decisions automatically. We can think of

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[99] Wall, M. 2016. *How long will you wait for a shopping website to load*?

it as intuition or gut-feeling, and because it operates automatically and cannot be simply turned-off, errors of intuition are more common than we what we would like to think. Cognitive scientists Philip Fernbach and Steven Sloman (2017) argue that human beings are constantly overestimating what they know. Their experiments show that most people have a very shallow understanding of things—even those which they usually claim to know very well. They call this "the knowledge illusion." Nowadays, most of us might have a broad knowledge of a lot of many subjects, but little in-depth knowledge of specific things, especially as our reliance on tools and technology increases. For Fernbach and Sloman, humans have the tendency to think as little as possible simply because it takes less effort to do so. However, the upside to this is that if we become more skilled and knowledgeable on particular tasks or topics, the demand for mental energy diminishes and the brain is more willing to engage in learned activities. This can easily be observed if you ride in a car driven by an experienced driver compared to when you drive with a teenager who has just begun to learn to drive. The experienced driver can comfortably hold a conversation while she smoothly makes a turn. On the other hand, the new driver is so focused on the task of managing the car, using a lot of mental energy, that any distractions to that mental-effort, including a conversation, could be detrimental to the driver, passenger, and the vehicle. According to Kahneman, System-1 has been designed by evolution to constantly assess our environment and provide quick evaluations (via emotions) of the current situations. We naturally have intuitive feelings and views on whatever is presented to us. In fact, it takes quite the effort to restrain ourselves from providing quick opinions on almost everything. Having said this, we need to remember that our minds do not work in a vacuum, producing opinions or evoking feelings without any context or precedent. Our minds are guided by experience and by assessing, unnoticeably, recent events and current contexts (Kahneman, 2011, p. 80-100). This would

explain why the intuition of experts in their domain of expertise is substantially better than the intuition of many of us on such domains.

Nicolas Carr (2014) and Cal Newport (among others) worry that our fascination for speed and quickness in all aspects of our lives might be reducing our capacity to engage in in-depth learning. They claim that the Internet—with all its tools and applications—is chipping away at our ability to concentrate on any given task for more than a few minutes or even a few seconds. Newport argues, in his book *Deep Work* (2016), that we are replacing deep work with shallow work due to the easy access to network tools and the presence of countless distractions. The current home and office environments (in which most of us operate) are not conducive to concentration, focused learning or deep work. We are not giving ourselves the time needed to get our mind to focus on any individual task. There are too many interruptions, and losing focus is quite easy. A study, reported by The New York Times (2013) and conducted by the *Human-Computer Interaction Institute* at Carnegie Mellon University stated that the average office worker gets interrupted every three minutes, and the time that is required to regain focus is about 25 minutes. It is evident that we simply lack the desire and opportunity to find the time needed to engage in deep work.

Time to focus on work activities is not the only valuable commodity difficult to find at the office; space to work alone without interruptions is also a rarity in workplaces that have extreme open-concept designs. It is very difficult for any person to concentrate on a task when there are phones ringing, keyboards clacking, and mice clicking all around you. Companies like Google, Facebook, and Samsung have built offices that hold hundreds of workers in large rooms. Their motivation is that by working together, workers will share ideas, experiences, and as a result create new, innovative products or solve complex problems. These ideas on collaboration

are supported by studies such as the one from Waber, et al. (2014) wherein they suggest that face-to-face interactions and designed encounters improve office productivity, and these improvements outperform those produced by digital work and collaboration alone.[100] In fact, they argue, digital collaboration is enhanced when people have face-to-face encounters. But, the crucial thing to understand from the Waber, et al. study (2014) is that interactions occur during 'designed encounters' and these encounters are for short periods of time and not during the entire work-day. Psychologist Matthew Davis, et al. (2011) have reviewed over one hundred studies on the topic of office environments. He concluded that although open offices might provide a feeling of innovation and cooperation, several studies have shown that the constant noise and interruption from co-workers has a negative impact on workers' ability to concentrate on tasks and to engage in creative thinking. In addition, other studies such as the one conducted by JH Pejtersen, et al. (2011) showed higher levels of stress among employees that worked in open offices when compared to employees that had private offices to do their jobs.[101]

The challenge for organizations is to design offices that facilitate communications and encounters while at the same time allowing people to focus on their work in their own space without disruptions. Working in shared work-stations might encourage discussions, but if employees do not have the time to think and complete tasks, then what are those discussions going to be about? Would they be about work and problems that need to be solved, or would they be conversations about social life only? A former executive that I interviewed (interviewee-six) told me that during his career he observed and participated in many good conversations

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[100] In 1997. Thomas J Allen was able to demonstrate a negative correlation, called the Allen curve, between physical distance and frequency of communication. Waber has been able to demonstrate that both face-to-face and digital communications follow the Allen curve.
[101] A study conducted by JH Pejtersen, Feveile, Christensen, and Burr concluded that employees working in open-office environments took about 62% more sick days than employees in private or semi-private offices. www.ncbi.nlm.nih.gov/pubmed/21528171

around coffee machines where people were able to share personal stories as well as work stories. He pointed out that these stories help build friendship and trust among co-workers but also provided a forum to exchange ideas for new initiatives and discussions about difficult problems that needed to be solved. He also added that in his organization people had their own office spaces to retreat to and do their work with minimal interruptions. Waber et al. (2014) point out that since 2005 technologists, programmers, and creative professionals are choosing to work side by side in what is known as co-working spaces, which allows them to be outside of the traditional cubicle office design and avoid the isolation of home offices. The main reason why people are choosing this style of workspace is to gain access to new knowledge by exploring ideas with people who have different levels of expertise. In these environments, one can be a mentor to junior colleagues and a mentee to others more experienced workers. Some of these findings draw attention to potential new models of workspaces that combine traditional office spaces, with public spaces and home spaces. These models need to encourage face-to-face communications whenever possible while also providing the opportunity for workers to engage in concentrated work.

For Newport (2016), having the ability and the means to engage in focused work is key for both personal and organizational success. This can be accomplished by moving "beyond good intentions and adding routines and rituals to your working life designed to minimize the amount of your limited willpower necessary to transition into and maintain a state of unbroken concentration" (p. 100). But, to build a routine, one needs to set aside time during the day and separate oneself from others to focus on tasks, and that requires having the space to be alone with your thoughts and away from devices that might interrupt the routine. Newport suggests we keep track of productive work by using the following formula: *High-Quality Work Produced = Time*

Spent x Intensity of Focus. A key component for an individual to produce craftsman-like quality work is to dedicate enough time and skillful effort to the task, which requires hard work and drastic changes to eliminate habits that distract us. Dealing with distractions is one of the most common issues that affect productivity. Psychological scientists from George Mason University, led by Cyrus Foroughi (2014), found that interruptions don't just take up time, they also degrade the overall quality of people's work.[102] This is particularly the case if you work in an open office environment where you are almost guaranteed to have your work disrupted by co-workers, meetings, phone calls, email exchanges, and instant messages. All these interruptions might make workers look busy and even feel good, but performing busyness is not the same as being productive.

For philosopher Hannah Arendt, thinking, "strictly speaking, is done in solitude and is a dialogue between me and myself; but this dialogue of the two-in-one does not lose contact with the world of my fellow-men" (1973, p. 476). It is in solitude where we find the potential for learning and reflecting which allows us to acquire and build personal knowledge. Turkle asserts that when we don't practice "thinking alone" (2015, p. 47), we are less able to bring ideas to others with confidence. Furthermore, Turkle worries that when we try to avoid solitude at all costs, we lose the opportunity to take advantage of the precious quiet time to "learn to trust our imaginations" (2015, p. 62), and to immerse ourselves in our own thoughts and reflections.

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[102] Foroughi at al. conducted a clever experiment by recruiting 50 college students and assigning them 3 writing essay tasks to complete. During two of the essay assignments, they interrupted the students for a few seconds at random intervals. At the end of the experiment they analyze the results and in 96% of the cases, the students performed worse when interrupted. The study didn't show precisely why this happens. However, it showed some evidence that working memory processes play an important role in our ability to bounce back from interruptions, but that memory is still nonetheless negatively affected when it is subjected to interruptions.

Deliberate Practice: taking time to learn and gain experience

Many of us have worked with managers and colleagues who have great intuition when dealing with organizational challenges, and we likely attribute their 'insightful thoughts' to their talents and intelligence. Indeed, talent and intelligence matter and probably play a role in forming their intuition, but the biggest contributing factor to the development of such intuitive skill is 'experience.' The acquisition of expertise is different from factual learning. Whereas factual learning can be completed relatively quickly, the acquisition of experience is a process that is complex, intricate, slow, and personal. Becoming 'experienced' is not about becoming proficient in one skill, but rather, as Kahneman explains, it is about becoming proficient "in a collection of many mini skills" (2011, p 238), and acquiring several skills takes time and effort. Daniel Levitin and Malcolm Gladwell popularized the idea that it takes 10,000 hours of deliberate practice and learning for an individual to become an expert in any given field. Gladwell argues that "ten thousand hours is the magic number of greatness" (2011, p. 41), but, from my perspective the actual number of hours truly required is not as important as the recognition that the process of in-depth learning takes time, is difficult, and requires focused practice. Kahneman points out that using the System-2[103] of our brain to engage in deep thinking and reasoning is quite exhausting, but it is precisely this hard-work that pays off in the quest to become an intellectual craftsman. The same applies to a chess player, a composer, a teacher, or a CEO of a company. Gladwell (2011) reports that when his colleagues studied the role of natural talent and intelligence in the development of expertise, they found it to be insignificant when you compare individuals who possess comparable intelligence. Instead, the determining factor in achieving expertise is persistence and a lot of diligent practice. Furthermore, not even 'hard

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[103] Kahneman defines system-2 as a cognitive process that is slow, analytical, and requires effort, to reason about our reality and to make complex judgments.

work' is enough, it takes a community of supporters, and the right circumstances (luck) for someone to truly become an expert in a field. If one carefully studies the trajectory of accomplished and successful individuals, one will find that their families, or their teachers, or coaches, or mentors, or colleagues play a significant role in their success. And not just the people in their inner circle, but even acquaintances played a key role. Case in point, Google would not have even started as a company if the Internet and the programing language C++ had not been in the state that they were when Larry Page and Sergey Brin wrote their code for a new and different Internet search engine. During the interviews that I conducted, the recurring theme was that each individual had a teacher, a parent, a mentor, or someone else they admired who helped them directly or indirectly become the professional they are today. Another shared observation from the interviews was that it takes time and effort to become skillful. When I asked interviewee-eight when he thought he became good at painting, the answer was that by 21 he was doing very good work and was able to secure his first job as an artist. He said, 'I was very good at a young age,' but when I asked him when he did his best work, he answered, 'well, that came much later. I was probably around 45 when I painted the murals that I will be remembered by.' He went on to add that it takes a lot of experience and practice to move from being 'good' (talent) to being 'excellent' (expertise). He recalls his parents and teachers telling him from a very young age that he had a talent for painting, but he did not feel he had begun to develop his potential until he got his first job and started to work with a master artist. The earnings from his job allowed him to buy art books and better-quality supplies. It was the combination of a mentor, educational materials, tools, and deliberate practice that allowed him to find his own style and his own way to make art. In a separate interview (interviewee-ten) with a former technology executive, he told me that he began his professional career in his early twenties without having a

lot of formal education or training. He attributes his personal success to the help he received from a manager who became his mentor and role-model. This boss, he told me, embraced him and taught him what he needed to know to keep his job and keep progressing in his career. He added that he followed this manager to other departments whenever possible to continue to learn until he became a manager himself, after years of learning and practice. For Newport (2016) and Kahneman (2011) acquiring expertise depends on getting experience and knowledge into long-term memory, and that takes time, guidance, and deliberate practice. There is a well-known joke whose source is unknown, and it goes like this: a pedestrian on 57th Street in Manhattan sees a musician getting out of a cab and asks, "How do you get to Carnegie Hall?" Without pause, the artist replies wearily, "practice, practice, practice."[104]

The term 'deliberate practice' was coined by psychologist Anders Ericsson in 1993 while researching how people become experts. His research claimed to have dismantled the myth that experts have unusual innate talents and instead, he argued, experts achieved high levels of performance through deliberate practice. For Ericsson, deliberate practice is the process of breaking down required skills into manageable small tasks and practicing these tasks repeatedly while at the same time eliciting feedback and reflecting on the outcomes. Ericson's work has led us to understand that mere practice could not make things permanent in our memory, but only deliberate and focused practice makes their execution not only permanent but perfect. His work suggested that neither learning everything about a domain nor gaining extensive experience in such domain leads to expertise unless deliberate practice and constant improvement is involved. Ericsson's work received wide attention among academics and business writers,[105] but it has also

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[104] For a short history of this joke, visit https://www.carnegiehall.org/Blog/2016/04/The-Joke .

[105] Ericson's work has been cited more than 4,000 times according to Google Scholar. Regardless of the controversy about his study and conclusion, he should be credited for bringing to the forefront the need to research 'expert performance.'

received criticism from others like Hambrick, et al. (2014) who argue that deliberate practice does not entirely account for the acquisition of expertise and that we cannot neglect other significant variables such as cognitive abilities.[106] What is clear from my personal experience and the interviews I conducted is that it is not just about doing one thing repeatedly, or just having the right mentor, or just attending the right school, which results in someone's becoming an expert. It is a combination of all those things and likely others, and more importantly, it is taking the time to learn, to be creative, to engage in focused practice, and to receive guidance and feedback.

With all the different theories and books on how to succeed and become an expert, it is not surprising that parents are confused about the education of their children and particularly what to do with them when school-time is over. By and large, most parents want their children to get an excellent elementary and high school education and attend a highly regarded college or university. This noble goal, and the fact that the number of high school students applying to college and universities continues to grow, have put a lot of pressure on parents to augment regular school hours with extra-curricular activities in an effort to give their children an advantage over the competition when it comes to the post-secondary institution admissions process. For Michael Thompson, a clinical psychologist and author of *The Pressured Child*, (2015) the challenge for parents is to realize that there is a fine line between a highly enriched, growth-promoting childhood and a stressful and overscheduled childhood, and that no expert can tell you were that 'fine line' is. It is up to the parents and the children to find that line. For Thompson, parents need to be more concerned about ensuring the child has enough sleep time, enough time to do homework, and enough time to engage in creative activities. Alvin Rosenfeld,

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[106] Ackerman, P. (2014) from the School of Psychology, Georgia Institute of Technology suggests that more than 100 years of research point to the importance of abilities in the achievement of expert performance.

a child and adolescent psychiatrist, and M.D. Nicole Wise (2017) agree that the key is to balance enrichment activities with downtime, boring time, and particularly love time.[107] To put it differently, parents should not be concerned about their children having free time to get bored. As Turkle (2015) noted, having the time to experience boredom could be very positive since boredom is "directly linked to creativity and innovation" (p. 39), and can signal new learnings and new interests.

Of all human emotions, boredom seems to be the one that parents and children feel must be avoided at all costs, that it is a waste of time. It is believed that it is better for a person to have a full schedule than to have time to get bored and get into trouble – the 'Protestant work ethic' is alive and well in 2018. But, another way of looking at boredom comes from psychologists Shane Bench and Heather Lench. For them, boredom, as an emotional state, encourages the individual to look at other potential experiences and allows the person to search for alternate goals. They state that "boredom acts as an emotional signal that current goal pursuits should be abandoned and that new goals should be actively selected and pursued" (2013, p. 461). Bench and Lench argue that we experience new and desirable emotions when we look for alternatives and begin working on new goals. Boredom is likely a mechanism we possess to signal to ourselves that it is time to stop ploughing through the same old tasks; it encourages seeking novel ideas or exploring new territories. Instead of seeing boredom as a reason to quickly and immediately seek out additional stimulation, we could see it as an opportunity for reflection, for mind wandering, and for taking time to generate creative ideas.

In 2010, Kyung Hee Kim, a creativity researcher and professor of Innovation & Creativity at the College of William & Mary, conducted a study of 272,599 creativity tests that

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[107] For Rosenfeld and Wise, love time means spending time with children communicating with no agenda in mind.

date back to 1970 and concluded that creativity has decreased among American children in recent years. The study also observed that children appeared to be less humorous, less imaginative, and have a reduced capability to elaborate or build on ideas. Ronald Beghetto (2005), a psychologist at the University of Oregon, suggests that what is likely hampering creativity is our current focus with standardized testing. Kim's analysis also showed that while SAT scores continue to increase, likely due to extensive studying and practicing, creativity test scores are declining because preparation for standardized testing does not encourage original thinking.

Creativity and curiosity have enabled humans to adapt and prosper in every corner of this planet. Our yearning for innovation and exploration, combined with imagination, are some of the most salient characteristics of humanity. However, trying something new can be risky, and it requires substantial investments of time, energy and attention – all with an uncertain outcome. According to Berlyne (1978), a psychologist at the University of Toronto, curiosity has become a virtue and a prime aim of education since the 1950's. Scientists, artists, educators, and business people are all trying to cultivate a culture of creativity and curiosity. A culture which encourages the exploration of things outside the realm of the known, the satisfaction of finding something that has been hidden or thinking of something that has not been thought. But such exploration requires time, persistence, and patience—all which appear not to be available for many of us.

The challenge for individuals, organizations, and for society is that we are facing complex problems, such as global competition, sustainability, security, and increasing inequalities, to name a few, which require innovative approaches to solve them. The solutions to such challenges might call for us to use new technologies, different types of data analysis, and several work collaboration processes, but more importantly, they require long-term thinking,

which means we need to give ourselves time to develop ideas (without expecting ideas to appear at the same speed as search engine results), time to share those ideas (without expecting to make it fit into a text message), time to allow ideas to percolate (without expecting everyone to provide immediate feedback), and time to put them into practice (without expecting quick results and profits). These tasks need persistent, focused, work.

Reclaiming

Knowledge Sharing
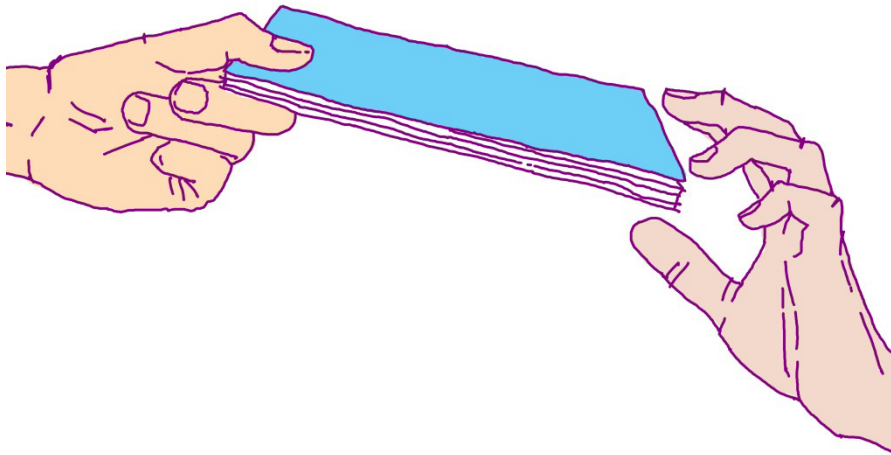
Alejandro Salas-Strus. 2018

Reclaiming Knowledge Sharing

> "*Humanity needs practical men, who get the most out of their work, and without forgetting the general good, safeguard their own interests. But humanity also needs the dreamers, for whom the disinterested development of an enterprise is so captivating that it becomes impossible for them to devote their care to their own material profit*". (Marie Curie, 1946)

Everett Rogers, in his influential work *Diffusion of Innovations* (1983), presents a method to attempt to explain how ideas and innovations are adopted by others. While knowledge acquisition might be a personal endeavor, many of us look for ways to share information and to engage in knowledge transfer activities. Rogers starts by defining innovation as "an idea perceived as new by the individual" (p.VIII). He goes on to clarify that "the perceived newness of the idea for the individual determines his or her reaction to it. If the idea seems new to the individual, it is an innovation" (p. 11). For Rogers, newness of an idea, a practice or an object is attached to the individual's experience, regardless of the amount of time elapsed since that idea or innovation was first used or discovered chronologically. Rogers' method has four elements: the innovation, its communication from one person to another, a social system, and what happens over time (p. 10-37).

A key element in the process of the diffusion of ideas, particularly within an organization, is human interaction. It is the communication of information between individuals that determine the rate of knowledge transfer from the people who have experience and knowledge to the ones who don't have it yet. Research on knowledge transfer from Williams (2010), McGregor, Helbert & Kaser (2011), Nonaka (2006), and others, point to the importance of trust and cooperation for successful knowledge creation and transfer. From the interviews that I

conducted, trust, respect, and openness were mentioned by all the participants as being key prerequisites for any type of mentoring or knowledge transfer activity. Interviewee-three was emphatic about this point. He told me that he did not care how much knowledge a potential mentor could have, that if he didn't trust him or did not admire his behavior, he would not choose this individual as a mentor. For several interviewees, a good mentor was also viewed as a role model worthy of emulating. Interviewee-six said that for him the most important aspect was learning how managers treated their employees, and he admires those managers that get things done in a fair way. For interviewee-ten, good mentors attract employees to their groups. Interviewee-ten recalls how he was able to follow his mentor around the organization when this manager moved to different roles. These moves gave this interviewee the opportunity to have widespread knowledge of the activities of the company, and he credits his mentor for facilitating his professional growth. Another point that most of the interviewees mentioned was that mentors need to be sought out not only for their knowledge but also for their positive behaviors towards others. Interviewee-three told me that he doesn't like the idea of being appointed a mentor or mentees. He believes that the role of the organization is to create an environment for these connections to happen, but that the people need to search for their own mentors. Interviewee-four explained to me that in his organization, senior professionals are given the time and remuneration to ensure that they can bring more people to their seniority level. He added that it was critical for the company to keep growing the pool of senior professionals, and he felt that the only way to accomplish it is by having mentoring and knowledge sharing activities.

Mentoring, knowledge transfer, and continuous learning are not new concepts, many trades organizations in North America and Europe maintain institutes that provide their members with opportunities to improve their own education as well as providing them access to learning

resources and social networking activities (Attwell, 2007). The more recent trend on lifelong learning has been driven by changes in business practices and technology. A useful classification of learning is: formal and informal. Formal learning typically involves periods of formal education and training, usually within the context of an institution, while informal training does not come from educational programs, instead, it comes from observations, mentoring, coaching, and other similar programs. Although informal learning does not come with a diploma, organizations are beginning to understand its role in developing competencies among its workforce, and the contribution to the overall organization's intellectual assets. For Nonaka et al., any new knowledge that a worker is acquiring, from within the organization or from external sources, is in many ways connected to the overall organizational knowledge (2006).

While advancements in communication technology tools are facilitating sharing data from anywhere at any time, organizations are discovering that trying to implement programs which promote knowledge sharing are in many cases unsuccessful due to their institution's behavioral norms and practices, also referred as "organizational culture" (Alavi, 2005; Barney, 1986; De Long, 1997; Schein, 2017). For Schein, organizational culture plays a key role in how current employees teach and share knowledge with new employees. Organizational culture directs a way to perceive, think and feel about processes and issues within organizations (2017, p, 3-30). For example, if the culture of an organization intentionally or unintentionally encourages knowledge hoarding as a way to secure a job, employees will be reluctant to share knowledge with others. On the other hand, if organizations demonstrably hold values of openness and support, they might be more predisposed to knowledge sharing and collaboration (Alavi, et. al, 2005, p. 197).

Trying to leverage organizational knowledge in absence of a supportive culture will likely not produce desired results. Organizations must enable the conditions for effective information processing and exchange, complemented with a culture that values knowledge sharing. For Nonaka, knowledge creation is more effective when employees exhibit a high degree of care for each other (mutual trust, active empathy, access to help, leniency in judgment, and courage); only in this way are organizations able to nurture a culture of collaboration. But this, Nonaka (2008) warns, is at best a fragile process.

During an interview, interviewee-one told me he has observed that organizations have become risk adverse and driven by fear of failure. He added that fear has moved into our personal lives and yet when we share stories, we only focus on stories of success and accomplishments. We know, he emphasized, that reality is not like that and success is usually the result of many learned failures. For him, if we are unwilling to tell the stories of actions and decisions that resulted in failures, then we are not really sharing valuable information. Organizations, he concluded, need to promote a culture where people are not being shamed or portrayed as weak when they take risks and make mistakes in the process of learning. The risk of not openly talking about decisions that lead to failure is that we then make success look like luck, or magic, and therefore, unattainable. Knowledge transfer initiatives where people do not tell the full story are not helpful to the learner or the organization. Other interviewees had a similar perspective, they spoke about openness and the need to 'tell all' the good with the bad for mentees to gain a full picture of the experiences of the mentor.

Mentoring activities have been practiced for thousands of years, throughout many different societies, to transfer knowledge and train new generations of workers. There is a plethora of definitions of mentoring and many ways it gets practiced. In the last thirty years,

mentoring programs have become very popular in the public and private sector. A literature

search conducted by E. Ralph on academic search sites illustrated the expanded attention that

mentorship is receiving in all circles including social science, business management, and

particularly healthcare (2010). A broader internet search on mentoring produces thousands of

returned articles: from academic journals to business magazines, from blogs to YouTube videos;

what is clear is that there is no consensus on a definition. Colley, quoting Piper & Piper, wrote

that "the concept of mentoring remains elusive and in relevant literature, its discussions and

evaluation has tended to be programmatic and anecdotal" (2002, p. 2). Interviewees -one and -

thirteen both told me that mentoring has become one of the buzzwords for companies looking for

'silver-bullet' solutions to their challenges. Interviewee-one added that the new fad these days is

called "sponsorship' meaning that employees need a sponsor to help them succeed. Interviewee-

four told me that at the most fundamental level, mentoring is about helping the mentee define his

own journey and what it means to succeed under the guidance of a mentor who has some

experiences to share. For interviewee-one, knowledge transfer is experience-to-experience

transfer, and anyone—regardless of age, gender, or job title—can bring experience to the

knowledge sharing table.[108]

Definitions of mentoring vary widely and are often used interchangeably with the word

coaching (Cranwell et al., 2004; Ralph & Walker, 2010). But at the core of mentoring is the

intent to cause someone else to learn and acquire her own knowledge. Mentoring, as a human

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[108] Interviewee-one told me that when she speaks to organizations about mentoring, she focuses on
explaining that the process of deciding who is the mentor and who is the mentee depends on experience
and not age or gender. She uses the following example to illustrate her point: There is a woman who just
had her first child and is feeling very guilty because at times she doesn't feel like taking care of this baby.
She believes she is a terrible mother. There is another woman who could mentor her. This other person
had three children and plenty of experience raising children. She tells the first woman that her feelings are
quite OK, and that most women experience similar feelings at some point in time about their new babies.
She then tells the audience that the new mother is a 40-year-old executive that for the first time she feels
that she is not in control of a situation, and the second woman is a working mom in her late twenties.

interaction process, is an effective way of teaching, and its performance is driven by interactions between mentors and mentees. Furthermore, mentor and mentee performances can also be influenced by interactions in multiple directions among mentors and among mentees (Kent, 2013). This supports the idea that knowledge is fundamentally constructed and not given, and that mentoring is not simply an exercise in information exchange, but a dynamic interaction between individuals. It needs to be adaptable and modifiable into a form that makes sense within particular settings and for particular participants.

There are many mentoring strategies employed by various organizations. Some of these strategies are formal and structured, where all activities are coordinated by a specific group or department, such as Human Resources; others are informal, where mentoring activities are driven in an unstructured way by workers who might be looking for social connections or self-development (Cranwell et al., 2004). Some are designed to include people in senior positions acting as mentors, and people in junior positions acting as mentees. While other models promote that all participants could be mentors or mentees depending on specific contexts (Ralph & Walker, 2010). Mentoring sessions could be conducted face-to-face,[109] in virtual environments,[110] or a combination of both. Although there has been substantial research done on traditional face-to-face mentoring from the perspective of relationships, gender, race, age, social status, etc., there are fewer articles that provide empirical evidence regarding outcomes of e-mentoring initiatives (Ragins & Kran, 2007).

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[109] In this type of mentoring setup individuals meet in person to share emotions, experiences, and ideas. Through conversations, their ideas and skills are discussed, analyzed, tested and this is where knowledge creation is likely to begin.

[110] Mentoring in virtual environments is also referred to as e-mentoring and is facilitated by several tools which enable participants to exchange information on their own time, or to meet using video conferencing. These virtual environments can accommodate many participants (mentors and mentees) at the same time.

The proliferation of e-mentoring programs might suggest that organizations perceive them to offer certain advantages over traditional in-person mentoring. Ragins et al. suggest that there are five major advantages to e-mentoring programs: greater access to mentors (as they can come from either within an organization or outside), elimination of geographical and time zone barriers (as communications can happen anytime, anywhere), reduction of administration cost (particularly for training purposes), equalization of status among participants (virtual communication is less intimidating than in-person communication), decreased emphasis on age and more emphasis on what each person can contribute, and the possibility of recording interactions among participants for future reference. There are also potential pitfalls of e-mentoring programs such as the inability to communicate nonverbally, increased difficulty in assessing the emotions of participants, increased time necessary to develop strong relationships and trust, as well as technical concerns regarding privacy and surveillance.

This investigation has revealed six common themes describing key elements of effective mentoring initiatives. These include:

1. Mutual respect, trust, and willingness to be comfortable expressing feelings and revealing vulnerabilities. In other words, a caring relationship.

2. Open communication about the process, expectations, goals, challenges, and ongoing feedback.

3. Easy access to mentors and to convenient technology tools when appropriate.

4. Sufficient time to participate in mentoring, including the opportunity to engage in role modeling or work shadowing initiatives.

5. Participants must be passionate about exchanging information, since both mentors and mentees will learn in the process.

6. Promote autonomy in the selection of mentors and mentees. Possibility of choosing participants from outside the organization.

Once an organization decides to introduce a formal mentoring program, a couple of key questions need to be asked: What does the organization want to achieve? What are the desired outcomes? These questions demand that the scope, objectives, and expectations of the program be well defined. In all types of mentoring, organizations need to provide information systems designed to support a repository of data, messaging, collaboration, simulation and video conferencing (among other tools) in order to enable effective teamwork and extensive exchange of information.

An important part of any mentoring program is to have an evaluation mechanism to scrutinize whether the mentoring initiative is having a positive effect. The following are a few useful evaluation metrics:

Were the mentoring objectives achieved?

How well did the technology work?

Were the mentoring activities efficiently performed?

Were the format and atmosphere of the encounters conducive to appropriate exchanges?

Were there any social benefits?

Is there an on-going dialogue between participants?

These metrics could be evaluated using some of the following methods:

Mentor and mentee reflections

Evaluation surveys

Achievement data

Usage data from the software applications used

As part of this dissertation, and based on the research, I designed a basic proof-of-concept / prototype software system to serve as a platform for mentors and mentees to use while they engage in mentoring and knowledge transfer activities. The system has four primary functions: 1) Profile information to identify members and allow them to describe their knowledge and experience. 2) Communication tools for members to keep all relevant information in a common data repository, to engage in e-conversations, and to access a video conferencing platform (all these tools are commercially available in the marketplace that could be integrated into a final product version). 3) A mentoring section to facilitate mentor selection, and a space to provide feedback. 4) An area with additional information regarding mentoring and knowledge sharing. Refer to Appendix B for screen prints of the system.

FINAL REMARKS
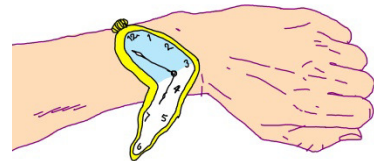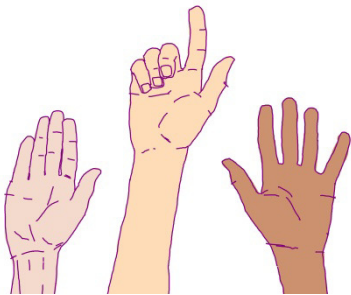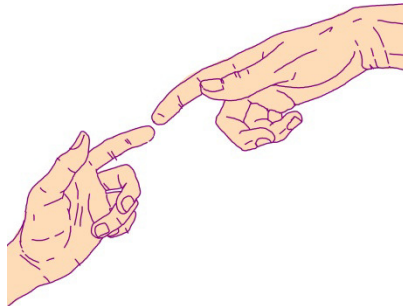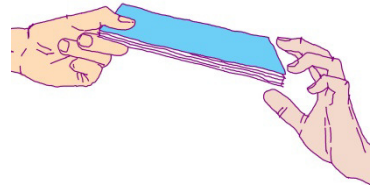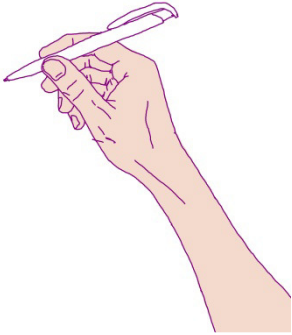
Final Remarks

One by one the pikes are moved about the pole

 More beautiful

Than coloured ribbons weaving.

The clean strike of the pike into the pole; each man

And the balance both of body and mind,

Of each of the others: in the back of each man's mind

The respect for the pole: it is forty feet high, and weights

Two thousand pounds.

In the front of each man's mind: "She's going to go

Exactly where we want her to go: this pole

Is going to go into that seven-foot hole we dug

For her

To stand in."

This was in the deepening dusk of a July night.

They were putting in the poles: bringing the electric light.

Men Working. Edna St.Vincent Millay (1940s)

The Canadian Government's new software system, called Phoenix, was intended to save the government over 75 million dollars a year by eliminating 'unneeded workers' and automating manual processes. Instead, it became one of the biggest software project failures for the Government of Canada, with a potential price tag of over 1 billion dollars. Government bureaucrats continue to search for a solution to the massive problem, which at its root is due to a lack of appreciation for the expertise held by civil service office workers about government

processes. It will cost Canadian taxpayers more than ten times the anticipated savings it initially promised. Certainly, it is not just one issue or one bad decision that caused this project to go awry, but evidence is pointing to the fact that the government blindly eliminated 700 jobs too early in the project, and when those people walked away from the government office buildings so did their knowledge on the 'how-to' of government business. It is not uncommon for managers and external business consultants to undervalue the knowledge that people have accumulated from their years of experience doing certain jobs. These jobs appear to be so easy that many of us tend to trivialize the actual knowledge required to execute them. 'How difficult can it be to do this task?' is the typical attitude that many of us have when judging the complexity of a job. This would not be a surprise for cognitive scientists Sloman and Fernbach, who have been studying how people learn and acquire knowledge for many years. In several clever experiments they were able to demonstrate that people have a tendency to overestimate the knowledge they possess personally and underestimate the complexity of concepts and tasks. Furthermore, people feel very confident and speak with authority about topics and tasks that in reality they know precious little about. There is also the notion, particularly among technologists, that knowledge can be simply documented and captured in rules and processes that can then be automated or learned by someone else quickly. The underestimation of the time and effort that is required to acquire personal knowledge has resulted in the devaluation of experience and expertise which can only be accumulated through years of practice.

When I began this dissertation, I recognized what I considered to be a significant fault with institutions which lacked an organizational culture that values personal knowledge, experience, and knowledge sharing. I also thought that the right combination of educational theory and technology could enable the acquisition and sharing of personal knowledge. However, the more I

explored how people think, learn, and relate to each other, the more I realized that unpacking what constitutes tacit knowledge (and figuring out how to transfer it) was an investigation that provokes more questions than it provides answers. What this journey has shown me is that there are no simple answers about how people learn and acquire knowledge and that there are no processes that can be automated to ensure that people share their knowledge. What I discovered during this research is that acquiring personal knowledge takes time, guidance, and dedication. One cannot transfer personal knowledge, but only help someone else develop their own personal knowledge. Instead of trying to design processes and software to transmit 'know-how,' I learned that I should focus on facilitating 'how to' experiences through which a learner can develop her skills.

I grew up in a house full of books, magazines, and newspapers. My father was an avid reader who would go out of his way to ensure we always had books to read, even if those books, like Neruda's or Marx's books, were not viewed as desirable books to have in your possession during Latin America's dictatorship regimes of the 60s and 70s. While reading poetry together with my father, I recall many occasions when I would ask him to explain the meaning of a poem. His answer was always the same; he would say, "let the feelings and emotions from the words of the poem take hold of you. Your body will then work out the meaning." Poets like Neruda, he explained, challenge readers to feel deeply, and through those feelings learn and understand the message. Our body provides the signals and the channel by which we come to know the world and acquire personal knowledge. Understanding the body is far more interesting than understanding only the language spoken. Our vocabulary falls short in describing what the body can do with its enormous range of feelings, movements, and expressions. Humans are well

equipped to receive all types of sensations, and it is ultimately the body which opens up the possibilities for imagination, for experience, and for learning.

I am concerned that Western society has become too obsessed with speed, convenience, and immediate satisfaction, and that these obsessions have constructed a fantasy that knowledge can be acquired quickly with minimal effort, that algorithms and smart robots can easily replace experience and intuition, and that our desire to develop in-depth understanding has been replaced by search engine savvy. Mary C. Richards warned us that we are losing the spirit of the craftsman, a spirit that searches for in-depth knowledge and not superficial familiarity with concepts, a spirit that doesn't compromise personal satisfaction and happiness in exchange for material prosperity and professional recognition (1989, p. 109). The acquisition of personal knowledge is not about certainty; on the contrary, it is a recognition of the illusory aspect of knowledge. It is about focus, enjoyment and letting knowledge be internalized through experience. Without gaining extensive experience, there is no chance that intuition can be developed. Acquiring expertise by learning from experts is likely the most effective way to transfer knowledge. Polanyi explains this point:

> To learn by example is to submit to authority. You follow your master because you trust his manner of doing things even when you cannot analyze and account in detail for its effectiveness. By watching the master and emulating his efforts in the presence of his example, the apprentice unconsciously picks up the rules of the art, including those which are not explicitly known to the master himself. These hidden rules can be assimilated only by a person who surrenders himself to that extent uncritically to the imitation of another. A society which wants to preserve a fund of personal knowledge must submit to tradition (1962, p. 53).

While researching personal knowledge, I had the opportunity to explore many related topics such as the role that aptitude, curiosity, and silence play in knowledge acquisition; how

our perception of time has evolved in the last couple of centuries; and how governments might speak of an open knowledge economy and enact laws to constrain or promote the free flow of information. What this journey showed me is that there are no single theories of education or communication that can explain how people learn. There is not just one type of technology that will work to transfer knowledge. There is no set number of hours or a specific time-frame that people need to dedicate to develop a specific skill, and that there are no rules that can be codified to transform information into personal knowledge. However, like Mary C. Richards, I hope that reclaiming craftsmanship encourages us to be engaged in constant learning, improving our skills and most importantly, sharing our knowledge with others. Instead of being a passive receiver of information, a craftsman builds and influences the world. A craftsman has the desire to do something well for its own sake and not only for financial gain. A craftsman, as Sennett explains, likes to plan but not too much. She would rather work with sketches that allow her to adapt and improvise depending on the circumstances and rejects uncompromising plans that could cause her to miss out on more rewarding outcomes and opportunities (2008). A craftsman understands that during most projects she will not have the perfect conditions, tools, materials, or co-workers to work with, but she possesses the intuition and experience to adjust the project to take advantage of what is in front of her. A craftsman feels blessed to possess a talent, but knows that talent is not a replacement for practice and dedicated work. A craftsman embraces boredom, failures and challenges because they represent opportunities for learning and can produce unexpected novel results. More importantly, a craftsman is willing to share her knowledge and experience, and in the process of teaching and sharing she learns more and continues to improve.

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APPENDIX A - THEORETICAL PERSPECTIVE AND METHODS

Given the nature of my project, I have approached my research from a post-positivist as well as from a pragmatist perspective (Cresswell, 2009). Post-positivism questions and challenges the positivist notion of absolute truth, particularly regarding the subject of knowledge. It also recognizes that theories evolve as we learn and understand more about natural laws and human behavior. Pragmatists, on the other hand, are more concerned with applications and problem-solving rather than following specific rules and methods. In approaching my research this way, I have sought to understand the factors that influence outcomes (Creswell, 2009). My goal is to attempt to describe the processes that lead to such outcomes. More specifically, my concern is with what influences people to share knowledge and conversely how people learn from others. My goal has been to question rather than to pursue a definite solution to the question of how people acquire personal knowledge and how they share it. To that end, my emphasis is on learning and trying to gain an understanding of the processes that lead to sharing and acquiring knowledge. As a pragmatist, I approach the idea of knowledge as a derivative of our engagement and active experience with the world. I agree with Dewey (1909), who conceptualizes knowledge as the result of constant inquiry, a process of problem-solving by means of experimentation and constant reflection. Thus, knowledge grows through our attempts to try something new and gauge what happens. For William James (1907), knowers are actors or active participants exploring the world, not mirrors reproducing what is observed. It is we who choose how to assimilate and describe the world and therefore, we should not expect knowledge and thought to remain static.

In approaching the research from post-positivist and pragmatist points of view, I chose to use mixed methods or methodological pluralism (Hall, 2012), and combine qualitative and quantitative methods because knowledge cannot be divorced from the individual (being) and their personal experience. According to Green and Caracelli (2003), pragmatism is a particular stance between philosophy and methodology. This paradigm is a means of possessing flexibility and adaptability in using various methods to achieve a desired outcome. Such pragmatism, writes Patton, "means judging the quality of a study by its intended purposes, available resources, procedures followed, and results obtained, all within a particular context and for a specific audience" (Patton, 2002. p 71-72). Niglas (2001) echoes a similar sentiment and argues that the integration of different points of view might be the appropriate way to conduct research in many circumstances. I don't believe there is 'one' explanation that defines how people acquire personal knowledge, possibly not even a set of 'rules.' Instead, there are thoughtful descriptions, and acknowledgements of the complexities of the interactions between life, formal learning, and experiential learning. At its core, the study of knowledge acquisition and mentoring is the study of social relations. In other words, it is a study on how people act and relate to each other, and as such, it is conducive to the use of mixed-methods.

For my research, I strove to explore more in-depth learning experiences, and how users are benefiting from mentoring processes and programs, from a personal knowledge growth perspective. My interest lies in using multi-dimensional methods that could complement each other to add new knowledge that could be used to improve mentoring and knowledge sharing programs. As a post-positivist, an appropriate way to research is via qualitative analysis using surveys and interviews[111] with an emphasis on explanation and the description of general

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[111] Post-positivism recognizes the value of many forms of inquiry and research (Gamlen & McIntyre. 2018).

patterns. As a pragmatist, I approached the development of the software application by designing it, receiving feedback and adjusting it; this is a process that will continue to unfold as users provide more comments and the system gathers more data from users. When discussing the history of pragmatism, Professor Richard Ormerod (2015) from The University of Warwick argues that for the early pragmatist, William James, it had more to do with the person and human activity in a given context and less so with abstract concepts. Furthermore, he argues that Dewey, going beyond James, applied the philosophy of pragmatism to practical issues such as education and politics. In a small way, I am following in their footsteps in seeking not only to better understand personal knowledge acquisition, but to do something practical that might aid such acquisition and sharing. As James wrote, a pragmatist "turns away from abstraction and insufficiency, from verbal solutions, from bad a priori reasons, from fixed principles, closed systems, and pretended absolutes and origins. He turns towards concreteness and adequacy, towards facts, [and] towards action" (1907, 2004, p. 21). As a pragmatist, my interest is to lay the foundation for a tool to facilitate communication and exchange of information among members involved in mentoring and knowledge sharing programs.

During the last twenty years, we have experienced an explosion of social media technologies, and we have been introduced to radically new ways in which people communicate with each other. These tools have the potential to bring people together in virtual communities to share experiences and information. As part of the outcome of my dissertation, I have used techniques to develop prototypes and collect feedback from users, which were in turn

implemented in the design and development of an information-sharing software tool. The software has been designed for ease of use and it is currently part of a commercial product.[112]

The Web 2.0 application, www.endere.org, (see Appendix B) has been designed to collect login data, time spent on the system, frequency of accessed screens and functions, the number of entries and contribution that users make to the system, and many other data points. The analysis of this data provides (and will continue to provide) valuable feedback to the software application to make it more useful and user-friendly.

The idea behind the *endere* application is to provide an environment where people can share information about themselves and learn from each other in a protected and secure environment where the members/users own their data. The application is divided into four areas:

1. Skill portfolio. This section has been designed for people to share information about their education, skills, and experience. It follows a typical "profile" format to capture educational background and work-related skills. However, I have added sections where people can share their experiences and describe the skills that they have developed in their professional careers (or as part of their personal development) in a narrative format. My experience has shown that resumes or templates of work-related tasks inadequately capture the knowledge that people possess. Instead, most people like to talk or describe their work in terms of events and experiences (good or bad). Members of *endere* can tell their stories or upload any type of files that they would like to share with others. In the future, once text analysis software applications are more sophisticated and accurate, it might be possible to scan someone's email and

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[112] This commercial product has already been used by more than a thousand people. However, it is important to explain that it does not entirely belong to the author of this dissertation, and that several functions used in the commercial product have been developed in concert with other software designers.

project files to extract the experiences people have accumulated and then, populate this section automatically.

2. Knowledge Sharing. The idea behind this section is to link members of the community through mentor relationships. From the interviews that I conducted, every participant was able to name someone who inspired them and helped them in their career. This area has been designed to facilitate connections and to provide tips for effective mentoring and coaching.

3. Utility Tools. This section makes use of commercially-ready software tools that allow members to share documents, engage in dialogues, call each other, etc. The design is still cumbersome as a users must exit the *endere* application and have an account on the other applications in order to use them. In the future, I will be developing my own utility tools, using open source programs to make it easier and more convenient to share documents and communicate with other members. It is also imperative that the data stored remains under the ownership of the users and not a company. One of the key elements for mentoring is the ability to easily share documents or engage in conversations without having to jump from one application to another and without having to maintain several accounts with several different applications.

4. eLearning Resources. One consistent request I received during the conversations with the interviewees was for me to share what I have been writing in this dissertation. In this section, I added several of the chapters of my dissertation. It also provides the flexibility to add more documents from other community members that are also relevant to the topic of knowledge sharing, mentoring, and coaching.[113]

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[113] One of the interviewees gave permission to include a link to her writings on mentoring.

The application was designed as a straightforward platform that can easily accommodate changes and additions of other functionalities. This is consistent with a pragmatist worldview that encourages experimentation and learning from experience.

For the interviews, I selected thirteen individuals from various sectors including: Information Technology, Education, Health Care, Consulting, and the Arts. The participants were either chosen by me directly or indirectly, by referral, because of their ample experience in their respective fields. The interviews covered the following general questions:

1. I am interested to know what you think about mentoring and knowledge sharing. Can you please speak about your career in the context of learning from others? Were there any individuals that mentored you and/or did you have a good role model to follow; what sorts of things did you learn from them?
2. I am interested to know what you think about learning through experience by working with others.
3. How about learning from your (or others') failures, mistakes, and successes?
4. I am also interested in learning about your views on the current conditions within your organization and society in general regarding the importance of knowledge sharing.

During the interviews, I positioned myself as a researcher among colleagues, learning and sharing information with them instead of doing research on them. My intention has been to develop a narrative regarding experience and personal knowledge with the help of the participants. During these sessions, we talked about the issues raised by the participants, and I observed their reactions and how they were working out their own narrative. Personal knowledge is expressed in the stories people tell, in stories about their life experiences and the people who influenced them.

I used the interview method to understand and make sense of the way people explain what they do and the knowledge they have. Qualitative methods are an effective way to elicit and interpret information and explanations, and it is consistent with a post-positivist worldview which places more emphasis on explanations and descriptions of patterns rather than attempting to find an ultimate solution or theory.

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Appendix B – Endere.org prototype

The following pages contain screens of the endere.org application.

Education & Association

Institution/College

	Institution	Degree	Country	Province	City
Delete Edit	University Of British Columbia	Bachelors	Canada	British Columbia	Vancouver

Country*   --Select--
State/Province   --N/A--
City   --N/A--
Institution*   --N/A--
Degree*   --Select--
Upload Supporting Document   Choose File | No file chosen   Upload

Add

Association Memberships

	Association	Country	State/Province	City
Delete Edit	XYZ Association	Canada	Ontario	Toronto

Country*   --Select--
State/Province   --Select--
City   --Select--
Association*
Upload Supporting Document   Choose File | No file chosen   Upload

Add

Cancel

Group: [_____] ▾ 👤 [_____]   My Portfolio   🠖 Logout

Home | **Skills Portfolio** | Knowledge Sharing | Communication Tools | e-Learning Resources

Skills, Experiences and Languages

Skills | Languages | **Project Experiences**

Please add your personal and professional projects that describe your experiences. For example, you might have been involved in a data analytics project, or designing a curriculum, or building a new house, or starting a new business. All of those experiences have resulted in the growth of your personal knowledge. You can add a narrative of your projects and/or update relevant documents.

Project Name: [_____]

Description: [_____]

Add Document: [Choose File] No file chosen

[Add]   [Remove]   [Update]

Knowledge Sharing Experience

I have experience in:

☐ Designing/teaching online courses
☑ One to One coaching
☐ Teaching and Learning Strategies

☑ Large Group Presentations/Lectures
☑ One to One Mentoring

In my career I have (check all that apply):

☐ been a teacher
☐ been mentored
☐ mentored others

☑ been coached
☐ coached others
☐ taken teaching or facilitation training

Additional Information

Please add keywords or any other information which are relevant to your Knowledge Sharing Experience profile. These keywords will be used in the searching process.

Other: [_____] --Select-- ▼ Years [ADD]

[Update] [Cancel]

Personal Interest

Please specify your personal interest in

☐ Arts and Humanities   ☐ Entertainment   ☐ Hobbies and Activities   ☐ Sports and Recreation

Additional Information

Please add keywords or any other narrative which are relevant to your Personal Interest profile experience. Do you participate in community events such as races, or theater, or environmental groups? This information will be used in the searching process.

Other:

ADD

Update   Cancel

Resume / Curriculum Vitae

Choose File No File Choosen

Title:

Upload

Knowledge Sharing

Brief Introduction

In this section you can find out what a mentoring program is, ideas how to setup a mentoring program and how to support it.

Find a Mentor

In this section you can locate a potential mentor, review their skills portfolio, and send a note requesting to be mentored.

Provide Feedback

This section is designed for mentors and mentees to provide feedback on the program and the mentoring sessions.

Find a Mentor

Please select your mentor:
- ○ Carly
- ○ Giovanni
- ○ Irina

Hello, this is Steve. I would like to be mentored by you.

[Send]

Communication Tools

Repository

When you are looking to share documents with other Endere members, this repository has the tools to ensure you can upload your documents easily within a secure framework. Your document will be accessible only by those people you select to share with.

Video Conferencing

This is a typical video-conference system to allow you to communicate with other people.

Dialogue

This forum gives Endere members an opportunity to express their ideas and to engage with other members in dialogues about topics that are important to them.

Dialogue

Topic: Topic Name

[Video Call] [Audio Call] [Messages]

Search: [   ] [Search]

Themes	Date	Author	Threads
Theme Name 1	24/03/2018	Junga Hung	14
▸ TN 1: Thread Name 1	24/03/2018	Junga Hung	2
▸ TN 1: Thread Name 2	22/03/2018	Junga Hung	3
▸ TN 1: Thread Name 3	20/03/2018	Junga Hung	1
Theme Name 2	18/02/2018	Oleg Pavlenco	5
Theme Name 3	05/02/2018	Oleg Pavlenco	8
Theme Name 4	18/01/2018	Giovanni Salas	18

e-Learning Resources

Alphabet of Personal Knowledge

This alphabet explores the etymology and history of key words in the context of learning and the acquisition of personal knowledge.

Brief History of Personal Knowledge

The word 'knowledge' is not only part of our everyday speech, but it comes with a long history of philosophical inquiry. Many philosophers and scholars have attempted to define it, and to this day there is not a general and accepted consensus of what 'knowledge' is. This section explores the concept of knowledge with a focus on "personal knowledge".

Reclaiming Human Connection

For most people, personal relationships are very important and are the sources of enjoyment and frustrations. Many of us don't realize and appreciate the role human communication and conversations have on our lives. Moreover, we are facing an expansion and adoption of chat-bots and robots and people might be modeling their language and behavior after these machines.

Reclaiming Learning

In this section the emphasis is on the constant interruptions from digital media which affect the way we engage in learning activities; the lack of skill most of us possess when it comes to dealing with the different modes of data representation; and the interference from media companies, using draconian copyright laws, to prevent and control access to information.

Reclaiming Time

This section examines the obsession of companies to generate short-term results at any cost, and the preference for quick decision making ignoring its potential pitfalls by not taking the time to think about those decisions. It also looks at the need to engage in long-term deliberate practice in order to learn and acquire skills at an expert level.

Reclaiming Craftsmanship

Reclaiming Craftsmanship is a project to reclaim the spirit of a craftsman, to take the time to learn and develop the skills necessary to achieve a high degree of proficiency. To reclaim a craftsman's desire to feel proud of a job well done for its own sake, to be curious about ambiguity and possibilities, and embrace successes and failures as opportunities to improve.

Home | Skills Portfolio | Knowledge Sharing | Communication Tools | e-Learning Resources

Alphabet of Personal Knowledge

A Aptitude	**B** Boredom	**C** Curiosity	**D** Dialogue	**E** Experience	**F** Failure
G Growth	**H** Humor	**I** Intellectual	**J** Judgment	**K** Knowledge	**L** Learning
M Metaphor	**N** Nurturing	**O** Organization	**P** Perception	**Q** Question	**R** Representation
S Silence	**T** Tacit	**U** Unconscious	**V** Visualization	**W** Wisdom	**X** Xerography
Y Yahoo	**Z** Zen				