The Renaissance Man Redux

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Introduction

This is a talk about knowledge and communication. In particular, I would like you to think about the ratio of one to the other.

I became interested in this topic through a PBS program about the intelligence of crows, which are amongst the smartest of birds. It included a description of some experiments that showed that crows could convey some knowledge between parents and chicks, specifically, that a certain person was dangerous and what he looked like. The survival value of such communication to the chicks is obvious and is a significant advance over most birds and other creatures who can only transmit knowledge to their offspring via their DNA. Getting information into the DNA requires natural selection and hence takes many generations. Cars kill more deer than any predator, but as I found out, they can't seem to learn not to run in front of one. They continue to use their instinctive strategy for evading predators.

Crows thus join a few mammals, such as canines, marine mammals and primates, as one of the species who use communication as a major tool in survival - eating and avoiding being eaten. But naturalists, who study the behavior of other animals, emphasize that their behavior can only be understood if it is assumed that animals know and understand quite a lot. They just aren't able to communicate it, even to others within their species. With a few exceptions in which the parents do provide some training, offspring must relearn through experience what the parents already know. This is a terrible limitation because it makes it impossible for there to be any progressive accumulation of knowledge. It's no wonder that most animals make do with rather modest-sized brains.

By developing language, humanity's ancestors broke out of this straight jacket. It is believed that language and the brain co-evolved. That is: as language was able to provide more information, the brain enlarged and adapted to take advantage of it. Simultaneously humans adapted their languages to make them both easier to learn and also to convey more complex information. This co-development went on for several million years, ending by most accounts about 100,000 years ago.

Language is best understood as a tool used in the areas of information and communication. Just as axes, knives and other tools allow humans to do many things they can't do with just their

bodies, language is a tool for enabling the sharing of information and ideas, and also for providing new ways of thinking.

Writing as a tool

A few thousand years ago, our ancestors invented another tool, writing, which overcame the memory limitations of the human brain, both long term and short-term. Until its development, there was no way to store information outside of the brain and all knowledge had to be transmitted orally. Such books as the Iliad and the Odyssey were passed on through many generations through their memorization and retelling, and all indications are that the transmissions were very accurate (Consider how Shakespearian actors can memorize hundreds of pages of text and rarely make mistakes in performances). By Greek times, extensive memorization was considered an essential part of being a learned man and was an inherent part of the Greek traditions of debate and logical investigation.

Despite these impressive talents, humans both die and forget; meaning the sum total of human knowledge could never exceed rather modest limits.

The invention of writing meant that knowledge no longer had to be stored in people's brains and so allowed an increase in the totality of human knowledge. Surprisingly, it was not entirely welcomed. No less an authority than Socrates decried its use. In Plato's Phaedrus, Socrates had the king of Egypt say: "*This discovery of yours will create forgetfulness in the learner's souls, because they will not use their memories; they will trust to the external written characters and not remember of themselves. The specific which you have discovered is an aid not to memory, but to remembrance, and you give your disciples not truth but only the semblance of truth; they will be the hearers of many things and will have learned nothing…..*"

Despite Socrates's reservations, writing quickly revolutionized intellectual life. By the end of the Roman Empire, scholars had recorded hundreds of thousands of texts, speeches and poems.

It's not clear if Socrates understood that writing is also an important tool in thinking. Our working memories are quite limited; they can hold only three or four active thoughts. For example, how many of us can do long division in our heads—or even multiply two 3-digit numbers. Writing allows us to easily do these things and also enables much more complicated thinking. In writing this talk, I wrote paragraphs focusing on one or two ideas. Then I put them together and found that often the combinations didn't work very well. But, I could then see the larger pattern and revise them so they made sense as a whole.

There was an argument between the physicist, Richard Feynman and a historian, who was interviewing him[i]. The historian called Feynman's notebooks a wonderful record of his work. No, no replied Feynman, they weren't a record of my thinking process, they were my thinking process:

"I actually did the work on the paper," he said.

"Well," the historian replied, "the work was done in your head, but the record is still here."

"No, it's not a record, not really. It's working. You have to work on paper, and this is the paper. Okay?"

Printed matter and the concept of the Renaissance man

Much of it Greek and Roman learning and literature was lost in the Dark Ages. Its partial recovery in the 14th century gave rise to the Renaissance in which progress resumed. The leading thinkers of the day have become known as Renaissance men. They were people who had broad intellectual interests and were accomplished in multiple areas of both the arts and the sciences. Such names as Leonardo da Vinci (1452), Michelangelo (1475), Galileo Galilei (1564), Nicolaus Copernicus (1473), Francis Bacon (1561) and Michael Servetus (1509-11) come to mind.

It can be argued that the invention of the printing press both created the renaissance men and led to their demise. After Gutenberg invented it in 1450, the price of a book quickly dropped by a factor of 300. The cost of one book, which had been $20,000 in today's money, was reduced to $70. Previously, intellectual pursuits had been limited to a few wealthy people—not necessarily the brightest—and so progress was halting at best. The press brought in a much larger segment of society. Knowledge and new ideas, previously closely held, became widely circulated and could cross-fertilize one another. In fact, all of the Renaissance men that I mentioned did their work in the century or so following its invention.

This resulted in a huge increase in the generation of new knowledge which led to an exponential rise in the number of titles published, a rise which continues to this day. In the 20th century, the inventions of radio, television and film have redoubled the amount of material produced every day.

Albeit much of what was, and is, printed is eminently forgettable. Nate Silver argues that most of this increase is noise; the amount of valuable material growing at a more modest rate. The science fiction writer, Theodore Sturgeon, said that "Ninety percent of everything is crap," a phrase which has become known as Sturgeon's law.

Today, there is no way anyone can keep up with the flow of information. Even the "best and the brightest" would be overwhelmed by one percent of what is produced on a daily basis. It is hard to escape the conclusion that today the sheer volume of information, combined with the difficulties, flowing from Sturgeon's law, of identifying the good stuff, makes it impossible to be accomplished in multiple disciplines. The Renaissance man concept has thus become an anachronism.

We have adapted to this problem by specializing – doctor, lawyer, Indian chief and all the rest. And each specialty has fragmented and then fragmented again. Each of us can become expert in some very narrow field and knowledgeable in its penumbra, but sadly must remain naive in most other areas. We find it dangerous to express opinions in an area other than in our specialty lest an expert in the area point out our inevitable errors or sins of omission.

I believe our Philosophical Club was created to get around this problem. Most of us are attracted to it, because it provides a safe way to explore our ideas within an intelligent forum.

The third revolution

We are entering a third revolution in communication and probably our ways of thinking. It is a unique development in human history and it's just beginning to take off. It has been brought on by the development of digital technologies, inexpensive computers and the Internet. Just as the inventions of writing and then the printing press forever changed human culture, the new technologies are changing it once again. And the rate of change is accelerating.

Printing, radio, television and cinema made possible the wide distribution of information and ideas, but using them has required major investments of time and money. Thus the barriers to an individual gaining access to these media have been quite high and required going through gatekeepers such as producers, publishers and editors. This has created a situation in which a relatively small number of people are providing content to the many.

The new technologies are effectively eliminating the entry costs and barriers, allowing anyone with something to say to get into the act. And many are. Does this mean that there is hope of becoming something of a Renaissance man? Probably not in the usual sense of the phrase; human knowledge has simply gotten too vast. But, there is definitely a much better possibility of remaining something of a generalist and getting an audience for your ideas. They are also providing more affordable tools to learn how to communicate.

I'll mention a few ways in which people have been helped to express themselves and go directly to an audience.

The Internet has produced a huge increase in the amount of writing that we do. In 1860 Americans wrote a per-capita average of five letters a year. Today, it's estimated that Americans compose 3.6 **trillion** words a day in the form of emails, tweets and blogs. This is approximately equal to the entire contents of the Library of Congress. OK, much of what is written is pretty banal stuff, but it has to help people become better writers, and perhaps better thinkers. Just knowing that someone will read what you write is a strong incentive to thinking through your ideas.

It is known as self-publishing when an author publishes her work without going through a publishing house. Sometimes the derogatory term ‘vanity publishing’ is used, implying that the work is not good enough to attract a real publisher. A number of self-published books, however, have gone on to become best sellers and self-published authors include such luminaries as: Emily Dickenson, Jane Austin, Marcel Proust, Walt Whitman and Virginia Woolf; perhaps they were just too original to be appreciated by the gatekeepers.

The new technologies are facilitating self-publishing by dramatically reducing the costs. Electronic publishing is virtually free and a number of companies are providing printing at per-book costs not much higher than those for large print runs.

Our skills in the graphic arts are also being enhanced. Photography and video have been facilitated by the development of cheap, but quite good, digital cameras and editing programs such as Photoshop: both video and still cameras also provide nearly instantaneous review of your work. No more waiting till you’ve filled a roll and then waiting again for the prints to come back from the lab. This has helped people learn how to be better photographers and produced an explosion in the quantity of photo and video images. YouTube alone posts thousands of hours of video a day, mostly produced by amateurs. Some of these catch on, or so to say “go viral,” viewed by millions of people.

Collaboration is enhanced. People who have a hobby or a special field of interest used to find it hard to connect with others having similar interests; there might be only one or two such people in their town. Now there are usually several sites on the internet dedicated to exchanging ideas in any given area of interest.

New thinking environment

We saw that the invention of writing and printing had two effects. First, they allowed the creation and distribution of much more information and knowledge. Second, they provided tools to help us think and create. So it’s fair to ask what impact the new technologies will have in these areas.

Availability of information

The Internet makes vast amounts of information readily available, much more than does traditional media. For example, I can research numerous libraries for sources while sitting at home, whereas I used to have to get in my car and drive to each of them. Wikipedia is now the World’s largest encyclopedia and has been found to be generally as accurate as encyclopedias produced by experts. Google provides quick answers to almost any question that I can formulate. In addition, there are numerous and diverse web sites that provide specialized knowledge. Even the Taliban has an English language web site if you care to visit it.

Moreover, it's extremely convenient to get information; in my pocket, I carry a smart phone that has: an Internet browser, a dictionary, the Google search engine, a world atlas, GPS, a bird book and much, much more. Almost any question about factual matters can now be answered in a minute or two. The biggest problem is discovering which of the hundreds of thousands of apps that are now available will be useful enough to invest the time needed to learn them.

Just as writing eliminated the value of memorizing large quantities of literature, the new ready availability of information makes it less necessary to store a hoard of specialized information in your head. That's not to say it isn't valuable to have a general understanding of a broad range of subjects. In fact, the new technologies make it possible to just that. Perhaps they will even make it possible to be a generalist once again.

Thinking

It is becoming increasingly difficult to be successful without being computer literate and especially learning how to use technology to leverage your mental skills. I'm not just referring to the fact that many services once provided by people are now being provided by computers, but rather that computers can be used to solve problems and give new insights into a wide variety of questions. It will become increasingly so in the future, because all aspects of computers, such as speed and storage capacity, are growing exponentially and a huge crowd of people are developing game-changing applications for them. Wall Street, for example, is eagerly hiring physicists and mathematicians because they find that they can devise computer trading programs that reliably make large sums of money.

I believe that the greatest advances will come from marrying the strengths of humans and computers. Humans have many skills that computers have not come close to matching and some remarkably powerful results have already been achieved by teaming humans and computers.

You have no doubt heard about the World-champion chess player, Garry Kasparov, being decisively beaten in 1997 by the IBM computer, Deep Blue. Apparently, the best humans are no longer competitive with the best computer programs. But, Kasparov asked what would happen if you formed a team with both computer programs and human chess players. The idea was tested in a 2005 tournament in which the players could be individuals, computers or teams of both. The winners were two rather low-ranked players using commercially available chess programs. They won because they were extremely skilled in using the programs in collaboration with their own playing abilities.

Because IBM was unable to make money off of Deep Blue, they targeted their next project on an area that had commercial prospects; answering questions posed in natural language. Their demonstration project was to pit their computer, named Watson, against the champion players of Jeopardy, the quiz game where the clues are in the form of allusions, puns and other tricky word plays. A typical clue was: "A garment worn by a child, perhaps aboard an operatic ship," and

the answer was: “pinafore.” The project was extremely successful and IBM ended up challenging the two best human players to a match. Watson’s score exceeded the combined scores of the two champions.

Apart from its ability to understand natural language, Watson was able to excel because it could draw on an enormous base of encyclopedias and other digitized knowledge, much greater than even the memories of human savants. IBM is now using the Watson technology to create reference-assistants in such information intensive fields as medicine and law. The idea is not to replace the professionals in a field, but to enhance their skills by providing them with access to all relevant, but obscure knowledge.

There are many other ways that the new technologies are changing the ways we act and think. The ways we are interconnected are without precedent. On the positive side, spontaneous mass movements can overthrow entrenched dictators—think Arab spring. On the negative side, criminals in places like Nigeria can steal money right out of your bank account.

It has always taken humans a decade or so to appreciate and how to best use a new technology. Famously, the head of IBM once predicted a market for 5 or 6 computers, and the head of the telegraph company, now AT&T did not see any value in the telephone.

In his book, “Smarter Than You Think,” Clive Thompson outlines a dozen or so ways he sees the new technologies are changing our minds for the better. But with the awesome rate of change, which is accelerating, it is too early to know which, if any, will be the most important.

I just believe that it’s a hell of a ride and it’s worth looking out the windows.

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[i] Clive Thompson, *Smarter Than You Think*,
A number of the examples are taken from his book.