

Mentoring Innovation: Mentoring People to Do What Artificial Intelligence Can Never Do

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Abstract

In his book on innovation *The Creative Spark* Augustin Fuentes tells how creative collaboration was the creative spark that started humans on their path of progress. Adam Grant in his book *Originals: How Non-conformists Move the World* describes the process of taking new ideas and shepherding them through to implementation that original thinkers use. In this new age of artificial intelligence (AI) these are things people can do that AI can never do. It is no longer good enough for people to be merely knowledge workers; a computer can easily beat you at that. Now humans need to be innovative collaborators and mentors able to build relationships and function as a team creating collective genius greater than AI can produce. This is where the future is going. As Google is teaching us, we must create cultures where 'smart creatives' can work and develop new ideas and products. What is the role of mentors in this? Mentors must learn to recognize these 'smart creatives' and then encourage them as they as they develop original ideas. Mentors can help displaced people learn new skills they will need to function in this rapidly changing environment when many jobs will be reconfigured if not eliminated by AI. This paper will discuss new insights into innovation and imagination and how mentors can prepare themselves and their protégés for a rapidly changing work environment. The emphasis will be on seeing work as a calling and developing a growth mindset to meet the challenges of the future.

Mentoring Innovation: Mentoring People to do What Artificial Intelligence Will Never DO

The world is facing a time of tremendous change. As Avril Harari points out in his new book *Homo Deus* (Harari, 2016), humankind is facing an unprecedented challenge in the rising of Artificial Intelligence (A.I.). He states that for the first time most men and women will lose their economic, social, and even military value as A.I. out thinks and out works them. Industries are rapidly changing and many types of employment are becoming redundant. Harari insinuates the possibility that artificial intelligence is developing so fast that it could soon completely replace Homo Sapiens. In his earlier book, he mentions: "We don't like to contemplate the possibility that in the future, beings with emotions and identities like ours will no longer exist, and our place will be taken by alien life forms whose abilities dwarf our own" (Harari, 2015, p. 214).

The above might sound like science fiction, but the reality is that huge and traumatic changes are coming to our world. No longer is it just manual laborers being dislodged, but now highly skilled knowledge workers are finding their work replaced by A.I. (Colvin, 2015). In the past, technology mostly replaced the manual and repetitive types of jobs; therefore, not many influential professionals and well educated people were alarmed. This is no longer the case. Now, InfoTech is advancing rapidly into all parts of the employment spectrum, threatening workers such as lawyers, doctors, managers, financiers, journalists; people who never thought they would have to worry now have reason to (McGinnis, 2014). People are now going to have to learn to do things that computers cannot do, or least do as well as people, if they want a job. We can do it! As Augustin Fuentes points out in his book *The Creative Spark: How Imagination Made Humans Exceptional*, we have historically used the trait of collaborative genius to lift ourselves beyond the competitive fray and become the dominant species on earth (Fuentes, 2017).

Mentoring can play a vital role in providing an answer to the challenges we are facing. There are two essential things that computers cannot do (so far) and that is express genuine empathy and be truly creative. Neither of these activities can be taught well in a classroom setting, but, instead, are accomplished much better in a mentoring situation. Consider empathy first. Thanks to the technology that enables us to peer inside the brain, research on mirror neurons indicates that mentoring is a great way to pass on things such as empathy. Mirror neurons are specialized cells that sense and mimic the feelings, actions and physical sensations of another person (Iacoboni, 2008). Researchers now know the neurological basis behind social learning theory first proposed by Albert Bandura (Bandura, 1977). People can learn by watching (observational learning)

modelled behavior. What the brain observes it perceives as reality. As a human experience mentoring, they are constantly processing the feelings of people around them, noting their body language, facial expressions, and voice inflections. The human amygdala, the emotional center of the brain, can read and identify emotions in milliseconds, and then make us feel the same (Goleman, 2006). All of this interaction can be taught, and must be taught, in a one-on-one setting.

Creativity is another activity that is not conducive to large group settings by its very nature. It is defined as an individual activity, producing something original and useful. A mentor can greatly assist by collaborating and providing guidance during deliberate practice, or mental training, helping the structure and the function of the brain change in response to the one-on-one training and guidance. (Ericcson & Pool, 2016) Augustin Fuentes refers to this as collaborative creativity.

“...Humans acquired a distinctive set of neurological, physiological, and social skills that enabled us, starting from the earliest days, to work together and think together to purposely cooperate. Our genes tell only one aspect of how we became creative at increasing levels of complexity” (Fuentes, 2017, p. 5).

Only after such extensive and intensive collaboration and adaptability can the brain engage in creative flow (Csikszentmihalyi, 1997). Creativity is extremely valuable to us as it not only enriches us culturally but also economically. In *How Google Works* the authors point out that: “the only way to succeed in business in the twenty-first century is to continually create great products, and the only way to do that is to attract smart creatives who are trying to do something different” (Schmidt & Rosenberg, 2014, p. xv).

This creates a great opportunity for the field of mentoring. As stated earlier, mentoring can effectively improve both creativity and empathy. However, both empathy and creativity are in decline right when it appears we will need them most. Creativity, as measured by the Torrance Tests of Creative Thinking (TTCT) with an ever-growing sample of 272,599 kindergarteners through 12th grade students and adults, had been on the rise in the U.S from 1966 when the test was first instituted until 1990. Since then, creativity scores have significantly decreased, with the most significant decrease being in the kindergarten through third-grade populations (Kim, 2011). As economic and military competition is heating up, and A.I. is threatening to take jobs, we shouldn't be losing creativity, we need to be mentoring and creating it!

Regarding empathy, the trends are not going much better if we want a more empathetic nation. There is a rising concern about the decrease in empathy and the resulting rise of narcissism, as indicated from longitudinal studies on college students from 1979 and through to 2009 (Konrath et al., 2010). Could the rise in screen time and a decline in reading be a partial cause of this? The Dutch scholar Jemeljan Hakemulder reviewed dozens of scientific studies indicating that reading fiction has positive effects on the reader's more development and sense of empathy (Hakemulder, 2000). According to a 2013 study by the American Academy of Pediatrics, eight- to ten-year-olds spend eight hours a day with various digital media while teenagers spend 11 hours in front of screens. In addition, one in three kids is using tablets or smartphones before they can talk. The researchers in the Konrath study mentioned above think social networks are partially to blame for the decline in empathy. Why? Our ability to sense the feelings and thoughts of others is learned based on seeing their faces, watching their body language, hearing their voices, none of which are often available when using social media.

If humans are going to learn to do things that computers cannot do, we will need to learn to not only practice creative thinking but to mentor collaborative creativity, which calls for high levels of empathy and social skills. We must stop the decline in empathy and the resulting isolation if we are to respond to the A.I. challenge that is now facing us. As the nature of jobs change, there will be more of a demand for skills that humans do best, i.e., what high achievers can do that brilliant machines cannot.

“The meaning of great performance has changed. It used to be you had to be good at being machinelike. Now, increasingly, you must be good at being a person. Great performance requires us to be intensely human beings. To put it another way: Being a great performer is becoming less about what we know and more about what we are like” (Colvin, 2015, p.54).

As the Google executives and others cited previously have pointed out, the creative and empathetic collaborative person, the relationship worker, will be the valued performer of the future.

Management expert Peter Drucker created the phrase ‘knowledge worker’ in the late 1950’s, expanding on it throughout his career (Drucker, 2001). This term is no longer quite as accurate. It is true, people will be working with more knowledge than ever before, but this will not differentiate them from artificial intelligence that can process and analyze information more efficiently than any human. Instead we need to coin a new term to describe what people must do to achieve what machines can’t. Experts agree; the most valuable people will be creative relationship workers (Colvin, 2015, p. 49). Empathy, collaboration, creativity, a growth mindset and openness to new experiences and experimentation will be essential.

A growth mindset versus a fixed mindset is going to be imperative. Mentoring can play a crucial role in helping us change our old mindsets into the new mindsets called for in this ‘creative relationship worker’ environment. For example, Carol Dweck has researched the impact of different types of mindsets on human development. She compares an open or growth mindset oriented toward learning from mistakes and gathering input from diverse sources, to a closed mindset dedicated to minimizing mistakes and limiting the range of its network. She showed that a growth mindset led to success in academic achievement, decision-making, and other effortful behaviors (Dweck 2006), and these results were quickly confirmed by other researchers (Blackwell et al., 2007). It was referred to earlier about the exciting advent of brain scans to show the efficacy of mentoring. It is interesting to note that Dweck (2006) used the brain-wave lab at Columbia to analyze subjects differing responses to feedback. The way people reacted to the brain-wave feedback depended on whether they had a fixed or a growth mindset. Specifically, the researchers wanted to know which of the subjects were most interested and attentive to feedback? People with a fixed mindset were only interested when the feedback was about ability, whether they got the questions right or wrong, not on information that could help them learn and improve performance. People with a growth mindset, however, paid much closer attention to feedback that would help them improve.

Dweck (2006) says that people fall into one of two groups when it comes to how they handle mistakes. Those that have a closed or fixed mindset react to a mistake with an attitude of forget this, I will never be good at it. Conversely, those who have an open or growth mindset react to mistakes as a learning opportunity. They set about discovering what they did wrong so they will not do it again. The growth mindset people invest time and effort to correct the mistake, and then make the mistake work for them. Consequently, those with a fixed mindset are more apt to repeat their mistakes because they try their best to ignore them. People with a growth mindset develop the tools to learn from their errors and tend to not make the same mistakes twice.

Recently researchers have using more advanced neural scanning devices to see the changes in brain structure, activity and cognitive control when a person develops a more diverse network and growth mindset (Schroder, et al. 2014). The researchers from the Clinical Psychophysiology Lab at Michigan State University found brain activity and cognitive control was altered after reading just a short two-page article regarding abilities. The message of the article was that hard work would always trump genetics. One group read the article about the benefits of having a growth or malleable mindset, while a second group read an article encouraging an immutable or fixed mindset, the idea that intelligence cannot be improved. They then completed a reaction-time task, while an encephalogram recorded their brain activity. They found that inducing the growth mindset had a significant positive impact on how intensely people paid attention when their errors were corrected and on improving their post error performance. They learned how to avoid the errors. The fixed mindset group, however, paid less attention when their errors were corrected, and were consequently more prone to repeating the errors, and were less open to new learning that would improve performance.

Research at Cambridge and Yale is indicating that the most important factor leading to creativity is just how open to new experiences and experimentation a person is. People who score high on the openness scale, one of the Big Five Personality Theory traits, are much more likely to be more curious and imaginative. A 2013 study from *The Journal of Creative Behavior* (Kaufman, 2013) goes further still, indicating that openness to new experiences can be more important to creativity than IQ. The researcher’s conclusion was that the more open your mindset to new learning and improvement, the more opportunities exist for inspiration to occur and prompt an innovative idea. Openness is characterized by a high need for cognition and a desire for deeper learning. It is strongly correlated with high intelligence. It does not necessarily help you in academics, but it

does help solving open-ended problems, which the real world is full of and the future world will increasingly be too (Fagan, 2014).

Openness to new ideas and a willingness to learn will be essential to growing and succeeding in the challenging new world filled with A.I. For example, researchers are now finding that the human brain can grow and change in response to intense training and a change in mindset. In a four-year study of new London taxi drivers and a control group, brain scans of the drivers indicated that having to learn the complex layout of London streets caused dramatic changes in their brain structure, specifically to the posterior hippocampi, the part of the brain concerned with spatial memory that enables navigation. Neurons were literally repurposed in the experimental group, literally bulking up the brain with brain tissue and new neural connections (Woollett & Maguire, 2011).

There is dramatic new evidence that both the structure and function of the brain change in response to various sorts of mental training. It is akin to the way our muscles and cardiovascular system respond to physical training.

“With the help of brain-imaging techniques such as Magnetic Resonance Imaging (MRI), neuroscientists have begun to study how the brains of people with particular skills differ from the brains without those skills and to explore which sorts of training produce which types of changes” (Ericsson & Pool, 2016, p.27).

This is neuroplasticity, the ability of the brain to continue to grow and change as neurons are repurposed and new connections are made.

There is another skill that humans can learn to enhance to further help differentiate us from machines. As InfoTech has grown more dominant in creating knowledge, the importance of human groups working together—as distinct from individual effort—has increased enormously.

“The most important advances in virtually every field have always involved collaboration and are increasingly being achieved by clearly defined groups. The evidence is in a meta-analysis study of several million research papers in 252 fields within science and engineering, the social sciences, and the arts and humanities over 50 years, plus two million patents of all kinds over thirty years. The results are starkly clear. In nearly 100 percent of the fields, more research is being done by teams, and the teams are getting bigger. In addition, the most influential work, that which is cited most often in the scholarly literature, is also being increasingly done by growing teams” (Colvin, 2015).

Mentoring is a collaboration. Teaching protégés how to mentor others can build a network of helpers, critical to the creation of a culture of creativity.

Collaboration is essential to most creativity. “The cocktail of creativity and collaboration distinguishes our species—no other species has been able to do it so well—and has propelled the development of our bodies, minds, and cultures” (Fuentes, 2017, p.2). The reason such collaboration works? The University of New Mexico’s professor Vera John-Steiner believes it is because collaboration enables people to compensate for each other’s blind spots and to stimulate the intellectual passion and enthusiasm. (John-Steiner, 1997) Adam Grant in his book *Give and Take: Why Helping Others Drives Our Success* says that in a company with a giver culture, people are much more active in helping others, they readily share knowledge, they share credit, provide mentoring, and are willing to make connections without expecting anything in return. Where such giver cultures exist, turnover is lower and employee satisfaction is high (Grant, 2013). A giant meta-analysis involving over 50,000 people found that such giver behaviors are linked to higher productivity, greater efficiency, lower costs and higher profits, and greater customer satisfaction (Podsakoff, et al., 2009).

What must be done? Skills that depend on analysis and accumulated knowledge are susceptible to replacement by artificial intelligence. We are moving from the era of the ‘knowledge worker’ to a time when empathetic creative ‘creative relationship workers’ will be key. Many organizations will not be able to innovate quickly enough unless they revisit their assumptions about what people can and should do. The authors of *Collective Genius: The Art and Practice of Leading Innovation*, represented some of the best thinkers from Harvard Business School, Pixar, and MIT. Their conclusion after studying Google, Apple, Pixar and others? “Because leaders are more made than born, organizations must identify people with the right stuff for leading

innovation and provide them with the experiences and resources needed to develop the right mindset and skills” (Hill, et al. 2014, p. 225). That sounds like a call for mentoring! Humans can and always will do things that brilliant machines cannot do. With the right mentoring and leadership, and a good dose of creative agility and empathetic collaboration, we can meet the big challenges ahead.

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