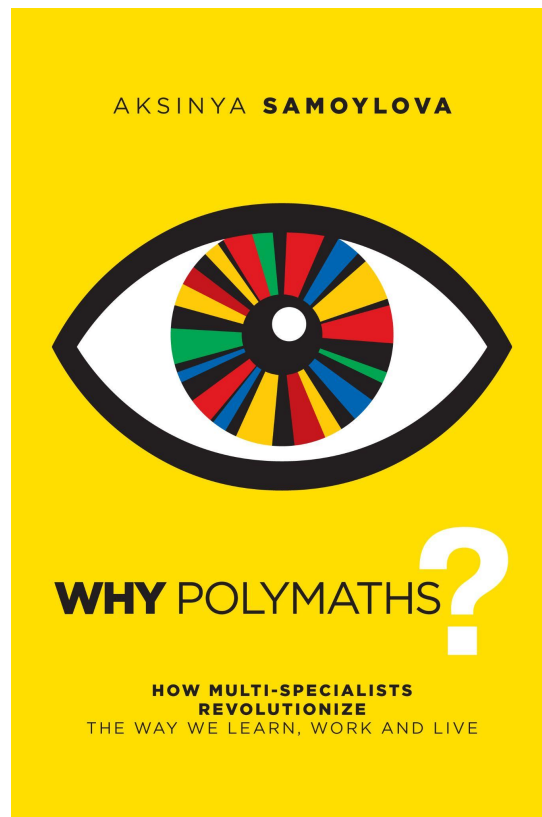


EXTRACTS FROM THE BOOK



WHY POLYMATHS?

How Multi-Specialists Revolutionize the Way We Learn, Work and Live

Movers and shakers have shaped the world we live in today. Throughout the millennia, many of these revered individuals have been polymaths – people distinguished by their ability to solve problems by drawing on a wide base of knowledge, spanning a broad range of subjects. It's therefore ironic that our modern hyper-specialized society has labeled many of these innovators 'geniuses', while ignoring the main quality that made their extraordinary contributions possible in the first place – their versatility.

Since the industrial revolution, the idea of polymathy has been frowned upon. Children today are told to choose one area of specialization and stick to it, whilst anyone knowledgeable and skilled in several areas is 'lacking direction'. The diverse CVs of modern polymaths are often seen as a weakness, rather than a strength, by employers who cannot see beyond a narrow set of preconceived qualities and experience. Once employed, polymaths may feel the need to play it safe and only produce what is expected of them, even if it's not their full potential.

However, the rapidly increasing complexity of life over the past decade has called polymaths back into the limelight once more, as multidisciplinary understanding is key to solving most of the complicated problems facing humanity today. The strength of Polymaths is their ability to see interconnectedness, to cross-pollinate, and to innovate in areas where disciplines intersect. All of these abilities are in high demand in the 21st century.

This book offers a panoramic look at polymathy in three areas:

History – across cultures and ages.

Science – from the perspective of psychology, genetics, and neuroscience.

Modern Life – polymathic education and career paths, interviews with modern polymaths.

Discover how adopting a polymathic outlook can revolutionize the way we learn, work, and live.

(Extract from Part II)

Psychology: Novelty Seeking and Neophiliacs

A brief glance at the biographies of great polymaths, past and present, tells us that curiosity is a trait of versatile personalities, characterized by a lifelong interest in learning, often simply for the sake of learning.

As with many other polymathy-related subjects, the study of 'curiosity' as a trait gained popularity in the 1960s, firstly with psychologists, but the groundwork had been laid long before. In 1949, one of the first curiosity researchers, psychologist Daniele Berlyne (also a wonderful pianist and lover of art) identified epistemic curiosity as being associated with novelty seeking behavior and the intrinsic joy of new discoveries. It's about a feeling, familiar to everyone: "I really wanted to figure it out".

Scientists speak of epistemic curiosity as the desire for new information that motivates exploratory behavior, which is rewarded with positive feedback upon acquiring new knowledge. Does this mean that someone living in curiosity mode is in a way constantly "on a high", simply because they receive a dose of positive impulses for satisfying their information quest? Novelty is known to trigger both our brain's reward system, which is involved in learning and memory, and the amygdala, which processes emotional information. Most of the people described in the first part of the book were famous for their high spirits. As an insatiably curious person I can only confirm the findings of correlations between the level of happiness and curiosity. The joy of learning seems to be an opiate on its own!

At the same time, a lack of curiosity has been linked to negative emotions. Studies have shown that temporarily depressed participants display a lack of curiosity. The same holds true of Alzheimer's patients, one 1992 study found that when presented with novel images, *"Alzheimer's patients spent significantly less time examining them than those without the disease"*.

Psychologists divide the trait of curiosity into two distinct varieties: broad curiosity, a general interest to explore any and all unknown areas of knowledge; and specific curiosity, a desire to reduce ignorance of a particular subject.

When people feel curious, they devote more attention to an activity, process information more deeply, remember information more accurately, and are more likely to persist with tasks until completion, believes Professor Paul J Silvia from the University of North Carolina. This is a strong argument for curiosity belonging to the 'depth' dimension of the polymathic construct.

Extreme cases of curiosity as a trait are called 'neophiliacs', defined by the Oxford dictionary as having "*a great interest in what is new; a love of novelty*". The neophilic is a very special type of person, highly interesting in terms of polymathy; they are avid seekers of novelty and will often go to great lengths to find it. Neophiliacs are often found working in digital technologies, especially as hackers. Renowned open-source software programmer Eric S. Raymond once posited that the rapid progress of digital industry is the result of having these neophiliacs as IT startup founders, or in key positions on the boards of IT companies. Interestingly, he also noted that most neophiles have disparate interests, and tend to be well-read. It is not unusual for a neophilic to be a "social butterfly", a technophile, revolutionary philosopher, and extreme sports enthusiast - all in one. Many neophiles and neophiliacs become part of cutting-edge subcultures.

Is this genetically predestined, or is it a construct of society? It is readily apparent that novelty seeking is being heavily stimulated by modern consumer culture; we are constantly bombarded by appealing images that awaken desires to try new foods, travel destinations, gadgets, etc.

Colin Campbell, professor of sociology at the University of York in the UK, has studied the nature of consumerism, and he believes that the existence of novelty seeking is a relatively new phenomenon. He argues that pre-modern societies tend to be suspicious of the unknown; Campbell dated the emergence of novelty seeking to the beginnings of the industrial revolution in the mid-18th century.

Does this mean that we are experiencing the next rise of novelty seeking in the 21st century? Nowadays, it's not just teenagers, but also small children and busy adults who all keep checking their screens for novelties. The world craves constant updates and

upgrades. Are we all turning into dopamine-charged neophiliacs? An unprecedented overstimulation of the human brain has been taking place in the last decade, where will it take mankind? Will it ultimately lead us to a polymathic boom?

(Extract from Part II)

Creativity and Innovation

“Part of what made the Macintosh great was that the people working on it were musicians and poets and artists and zoologists and historians, who also happened to be the best computer scientists in the world. But if it hadn’t been for computer science these people would’ve all been doing amazing things in life in other fields. And they brought with them, we all brought to this effort a very liberal arts sort-of ‘air’, a very liberal arts attitude that we wanted to pull in the best we saw in these other fields into this field. I don’t think you’d get that if you were very ‘narrow’.”

Steve Jobs

Throughout this book, we have seen plenty of historical and modern examples of polymaths who led paradigm-shifting innovations in multiple fields. Isn't it amazing to think that these innovations came about due to the integration of scientific thought, art, and technological innovation by an individual? Let me emphasize it by quoting Robert Root-Bernstein in his illuminating work *The Art of Innovation: Polymaths and Universality of the Creative Process*:

"Innovation in science and engineering is often portrayed as if it were distinct from that in the fine arts, perhaps because most definitions of innovation center on the idea of effective problem solving. Science and engineering are supposed to be objective, intellectual, analytical, and reproducible so that it is clear when an effective solution has

been achieved to a problem. The arts, literature, and music, by contrast, are portrayed as being subjective, sensual, empathic, and unique, so that it is often unclear whether a specific problem is being addressed, let alone whether a solution is achieved.

It therefore comes as a considerable surprise to find that many scientists and engineers employ the arts as scientific tools, and that various artistic insights have actually preceded and made possible subsequent scientific discoveries and their practical applications. These trans-disciplinary interactions must cause us to reconsider how we think about innovation."

However, the modern bias against polymathy is so strong that even among creativity researchers, there is a belief in the inability of skills and knowledge to be transferred across domains. It seems that only a few researchers, such as Root-Bernstein, who themselves have strong polymathic traits, are willing to state the opposite.

At the same time, some psychology researchers noted the tendency for highly influential creators to have broader interests and greater versatility than their non-creative colleagues. They also shared other distinguishing attributes like the creator's greater inclination toward nonconformity, unconventionality, independence, openness to experience, self-confidence, aggressiveness, risk taking, introversion, and even psychopathology.

We have established that most groundbreaking discoveries are born on the cutting edge, at the conjunction of different sciences or disciplines. Revolutionary innovations within one domain by hyper-specialized monomaths, on the contrary, are rare, but this fact hasn't percolated into the public's collective awareness. Given the informative possibilities of the exponential age, hopefully it won't take another hundred years to make people aware of the immense creative and innovative potential of polymaths.

To illustrate how polymathy manifests in the modern day, I have collected examples from various fields of human endeavour.

One of the most impressive and successful collective innovations of the 20th century is **Cognitive Science**, which emerged as an interdisciplinary study of cognition that combines psychology, artificial intelligence (AI), philosophy, neuroscience, linguistics, and anthropology. What a fascinating blend of knowledge! This field is especially attractive for polymaths of a scientific mindset.

Probably the trendiest innovation is applying AI technology to any other field. Take the merger of AI with financial services, aka **Fintech**. One of the rising stars, American fintech startup Zeta, creates payment services for shared budgeting, but it also goes far beyond classical banking services. Zeta gives customers recommendations on joint money management, and teaches them how to avoid risks and build competent relationships. In fact, Zeta solves their clients' financial and personal issues at the same time.

Another prominent story, after twenty years of working at the intersection of computer science, biology, and education, co-founder of Coursera, Daphne Koller, melded AI and Biology in pharmaceutical startup Insitro.

Starbucks is integrating new fields of operation; the famous chain of coffeehouses and roasteries is turning into a **neobank**. In 2018, the Starbucks payment app was the most-used app in the U.S., with an install base of 23.4 million, each of whom made at least one purchase in six months. Starbucks surpassed Apple Pay (22 million), Google Pay (11.1 million) and Samsung Pay (9.9 million). All of this was despite the fact that the Starbucks app can only be used internally, while Apple Pay can be used in many different stores. Apple Pay has since overtaken the coffeehouse with 30.3 million users, but Starbucks and its current 25.2 million is still ahead of Google Pay and Samsung Pay.

In the last 10-20 years, Google, Microsoft, Apple, Open AI, and Skype have all started hiring **philosophical consultants**. There is also a great demand in Silicon Valley for the services of "practicing philosophers". Professor Lou Marinoff, who has been pushing the "philosophers in business" trend since 2000, says that as the business world has

changed from manufacturing to a focus on services, workers have needed to hone their communication skills and strategic thinking.

In an interview with Forbes, Professor Christian Voegtlin, associate in corporate social responsibility at Audencia Business School in France, explained that Silicon Valley's fascination with philosophy can be traced back to Stanford University's 1986 launch of the Symbolic Systems Program, or 'Symsys'. This program was intended to prepare the next generation of leaders for the rapid advances of technology. The course examined communication between computers and humans, using neuroscience, psychology, logic, and contemporary philosophers. Former CEO of Yahoo, Reid Hoffman and co-founders of LinkedIn, Marissa Mayer and Mike Krieger are both alumni.

Intriguingly, Apple won't let an in-house philosopher talk to the press. Journalists speculate that Apple needed an in-house philosopher to explain to employees how to create certain products. Some years ago, employees of the Apple company shared a few details about the Apple University with the New York Times on the condition of anonymity. They reported that lecturers often compare the company's products to the works of great artists.

If you look at the recent **Nobel prize awards in Chemistry**, you will find that the primary motivating factors for modern chemistry is the acute biochemical and ecological problems facing humanity. This is why the latest Nobel Prizes are all in the fields of either biochemistry, ecology, or computer modeling. In fact, the largest current trend is the expansion of the range of objects under consideration.

InnoCentive is an open innovation platform that offers complex innovation challenges. In a form of crowdsourcing, it delivers collective impact through collective intelligence, giving access to a global talent pool and truly enabling innovation at a scale never before conceived. Companies post problems they cannot solve on the platform, along with a financial reward for anyone who helps out. The average award amount for a Challenge is \$20,000, but some offer rewards of over \$100,000. One of its prize winners, NASA Graduate Fellow Doug Corrigan, pointed out the crucial need for

versatility: *“My key piece of advice is to learn everything you can, from every discipline that you can, even if it’s not in your area of expertise. The reason that there is a challenge in the first place is because there are already experts who have not been able to solve the challenge. If it was easily solved by subject matter experts in that field, it wouldn’t have become a challenge. Therefore, you need to get outside of your field of expertise.”* There are many stories on the InnoCentive homepage where people share how they solved cases, and many of them were solved by multi-disciplinarians from completely unrelated fields.

Of all the creative fields, specialization seems to be the most common in the world of music, indeed many famous musicians were monomaths. But even here, polymathy also finds its manifestations, namely in the most complex and sophisticated of all musical creations, **opera**. A composer integrates instruments, vocals, drama, stage decoration, costumes, and choreography. Since opera performances are extremely resource hungry, they must also have a reliably high profit potential.

Dean Keith Simonton, professor emeritus at the University of California and researcher with polymathic traits, was curious to find out what kind of operas become most successful. He examined 911 operas, by 59 composers, that had withstood the test of time, and found that the all-time bests were poly-genre operas, works containing a bit of everything - drama, comedy, action, and romance. If specialization was the key to success, then the most popular operas would be of a single genre. This would be an easy recipe for a composer to specialize within a particular genre, say, in opera buffa (comedies). But no. It is multifaceted operas that win the hearts of audiences.

Curiously, this secret was known long ago in Indian culture, probably since the drama handbook *Natya Shastra*. From the classical epics to modern-day Bollywood cinema, the best works are accomplished in the so-called “masala” genre (named after the spice mix used in Indian cuisine), those that blend multiple genres in one work (action, comedy, romance, and drama or melodrama).

(Extract from Part IV)

Chapter 3. A Polymathic Approach to Higher Education

Academia is hell. It's specialization-mania.

Christian Madsbjerg

Inside and outside the university, the graduate needs that flexibility of mind, that ability to connect the apparently unrelated, to unite hitherto disparate fields of experience, which in industry and commerce is market opportunism and in scientific or scholarly research is the inductive leap of genius.

Harold Perkin,

renowned social historian

Only a handful of parents will allow their children to learn at their own pace, according to their own interests. Parents are not likely to question their offspring's status as objects, for which they have the right, if not duty, to make decisions and not be questioned. Children must fulfill their parents' educational visions, which are, with rare exception, the educational concepts of their nation state. The situation does not change when kids continue their education after school. At 18, a student is still an object, and not a

subject, in the education process. But today, with access to the sum of all human knowledge at our digital fingertips, shouldn't we rethink the role of students? Who should design education: the student, the university, the government, or the end-receiver, such as employers?

The answer is to be sought in the philosophy of education. It starts with a question about the nature and purpose of education. What is education? Does educating mean training for a job? Or is there something more to it? As a passionate life-long learner, I have never seen getting a degree as the final destination, or a prerequisite to enter the job market. For me, the purpose of education has always been in accomplishments: self-knowledge, knowledge of the world, and the integration of both into an awareness of one's place as part of a greater whole, which stimulates an ability to actively co-create. Know thyself, know the world, and contribute. This turned out to be a very powerful educational philosophy that has carried me all the way, enabling professional success almost effortlessly.

I wonder how humanity would benefit from regular meditation/philosophical contemplation on education's nature and purpose? A philosophical discussion could add a lot to the learning process, providing a lot more meaning, depth, and motivation. It could make a huge difference for both the children and the adults involved.

The Purpose of Education

One of the early educational concepts was the Greek *paideia*, which espoused the holistic development of human mental, physical, and aesthetic abilities in order to create a harmonious citizen. For Confucius, the goal of education was a noble man, morally well-bred, educated, developed mentally, physically, and aesthetically, combining deep knowledge with proper behavior. The pursuit of knowledge in Islam was seen as obligatory, a way of taking God's creation seriously. Islamic education has been a balanced growth of the total personality through training of the spirit, intellect, rational self, feelings and bodily senses such that faith is infused into the whole personality. In

the traditional Jewish community, life is centered on education, and the ideal is to produce “learners”.

The German term for education, *Bildung*, which originated in the Middle Ages, has its roots in old Christian theology, and was introduced into the German language by the influential late medieval theologian and philosopher Meister Eckhart in the context of the *Imago Dei* doctrine. *Bilden* meant that human beings should strive to become an image of God. It is striking that *Bildung* has no direct equivalent in English, for it is not fully captured by translations such as education or self-cultivation.

Speaking of educational ideals, it is interesting that the European ideal is associated with the name of the polymath Wilhelm von Humboldt. Humboldt and his contemporaries believed that *Bildung* meant the highest development of natural human capabilities, and his educational model went beyond vocational training. In a letter to the Prussian king, he wrote: “There are undeniably certain kinds of knowledge that must be of a general nature and, more importantly, a certain cultivation of the mind and character that nobody can afford to be without. People obviously cannot be good craftworkers, merchants, soldiers or businessmen unless, regardless of their occupation, they are good, upstanding and – according to their condition – well-informed human beings and citizens. If this basis is laid through schooling, vocational skills are easily acquired later on, and a person is always free to move from one occupation to another, as so often happens in life.” Remarkably, Humboldt expressed the exact purpose behind a polymathic education, it should be solid enough to allow a person to explore various career opportunities.

It was also Humboldt who first introduced the idea of a research-based university, which ultimately revolutionized the whole system of higher education in the 19th century. The Humboldtian university concept profoundly influenced higher education across central, eastern, and northern Europe, in direct competition with post-Revolutionary French concepts of the *Grandes Ecoles*, which imposed strict discipline and control over the curriculum and awarding of degrees. Universities built on the Humboldtian principle allowed students to resolve obstinate challenges, which led to major scientific

breakthroughs and economic benefits. It was the Humboldtian model that shaped today's leading research universities in the United States.

In the book *Humboldt and the Modern German University, an Intellectual History*, scholar Johan Östling tells a fascinating story of how “the Humboldtian tradition has been used throughout the modern era in order to defend an acquisition of knowledge that goes beyond vocational programmes and instrumental usefulness. This happened at the turn of the century in 1800, 1900, and 2000, respectively. In our own time, which is at least as beset by utilitarianism as any other, it contains an understanding of how studies can promote civic and human development”, He further points out that in today's Germany, the Humboldtian educational philosophy is strongly supported and used by all those who had objected to the university being reformed in line with an Anglo-Saxon model, which placed it in the service of the business sector. Philosopher Julian Nida Rumelin, who was a former Federal Minister for Culture of Germany, criticized the differences between Humboldt's ideas and the current European education policy, which interprets education as preparation for the labor market. Indeed, this policy is openly declared on the homepage of the European Commission “Higher education and its links with research and innovation play a crucial role in individual and societal development and in providing the highly skilled human capital and the engaged citizens that Europe needs to create jobs, economic growth, and prosperity”. Even though they mention undefined “individual” development, the focus is clearly on providing intelligent labor for the European states. This vision is replicated nearly identically across the world.

There are currently four models of higher education, known as the Athene, Berlin, New York and Calcutta models. In the Athens model, knowledge is pursued for its own sake. The Berlin (Humboldt) model aims to combine research and teaching in an environment that allows for total academic freedom. The New York model is driven primarily by market forces and entrepreneurialism, and the Calcutta model strives to make universities solve social problems. Guess which model is the most popular, given the rapid commercialization of higher education?

Education is no longer a means of personality development, but rather a commodity. Replaced by the term qualification, education hardly implements the development of a personality. Learning is often called “cognitive fitness” or “training” and people at work are seen as “human resources”. Interestingly, philosopher Immanuel Kant believed that education differs from training in that the former involves thinking, whereas the latter does not.

I can hear raised voices saying that all of this is just “idealistic nonsense”, that what one really needs for success in life is good professional training. As a long-term recruiter, however, I know that people who are enthusiastic about their personal and professional development (which is often linked to versatility) perform well and become highly sought-after experts.

In 2020, during a panel discussion on Austrian TV called "Digital Humanism", an education expert confidently stated that "We won't get the humanist ideal of polymaths together again". It is astonishing how the belief in human versatility has been eradicated from the public understanding! Meanwhile, it is exactly thanks to digitalization that we have instant access to almost all of human knowledge, meaning it's actually now easier than ever before to become a polymath.

In addition to the countless methods of self-education available through online media and similar sources, there are excellent paths for budding polymaths to obtain academic education. Traditional education teaches students to view the world through a single chosen specialty subject (their “major”): a student learns to see a particular phenomenon from one view, and never gets the whole picture. Alternatives include majoring in two (disparate) subjects, taking a major and a minor in different domains, or taking interdisciplinary studies, which allow students to explore each topic simultaneously through the perspectives of multiple academic disciplines.

(Extract from Part IV)

The Polymathic Paradigm Shift in Education

I believe interdisciplinarity has been a great forerunner for polymathy, and now it is time for the next step. As a holistic learning experience with depth, breadth, and integration at its core, polymathy is the next big thing.

The polymathic paradigm shift in education means a radical change in mindset: you don't specialize only in one domain to do the same job throughout your entire life. You can pursue multiple specializations in your lifetime. Create a rich integrative profile. You can. It is allowed.

This message needs to be taken to children and youths, to parents and employers. The polymathic approach will equip graduates with the skills to work in a variety of exciting and challenging settings, and make a difference in their chosen career paths.

Polymathy evangelists say we need polymaths to tackle today's multi-dimensional problems, people who are driven to find innovative solutions to complex problems. But why don't we "grow" polymaths to outright prevent such problems from happening? History teaches us that integration was the strength of multi-specialized personalities; their awareness and creativity were a significant part of what eventually became civilization. A person with a polymathic mindset is empathic, enjoys life, lives longer, and connects communities. A massive shift toward polymathy in educational philosophy could show stunning results as early as the next generation.