



# Modern renaissance: need for holistic knowledge and polymaths to drive change

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The renaissance is seen as a golden age in Europe that brought about a “rebirth” of the arts, sciences, architecture, and culture. It is thought to have started in Florence, an important port city and commerce centre in Italy, and it lasted from 1350 to 1600. With it, the middle ages came to an end and modern society was born, bringing about significant changes in politics, finance, and religion [1, 2]. The feudal system was abolished, and new concepts emerged that are still in use today in governance, accountancy, engineering, theology, and medicine. All of these are made feasible by the development of secular humanism, the discovery of new knowledge as a result of historical events (such as Greek scholars fleeing to Europe following the fall of Constantinople), and the emergence of polymaths since education back then was much more of a holistic endeavor. The “big four” figures of the Renaissance are Leonardo da Vinci, Raphael, Michelangelo, and Donatello. Although they were men of many talents, they are most recognized today for their contributions to art and architecture.

With his many skills, Leonardo da Vinci (1452–1519) is often described as a man who has “learned much” (from the Greek word *polymathes*) [1, 3, 4]. The emphasis is “learned much in different fields of study”, which highlights the time when the accumulation of knowledge was more generalized, and perhaps, scholars were free to pursue whatever fields that interest them. Some of the famous paintings attributed to Leonardo include Mona Lisa, the Last Supper

and Salvator Mundi, the last being auctioned for a whopping US\$450.3 million in 2017 — the most expensive artwork in history!

In science and technology, his works have been compiled in a book known as *Codex Atlanticus*, detailing about flight, weaponry, musical instruments, mathematics and botany [3]. Another of his famous sketch is in Folio 83-Verso of the Paris Manuscript B, which detailed the earliest idea of a helicopter (Fig. 1). This is believed to be conceived when Leonardo was employed as a military engineer by the Duke of Milan in the late 1480s. His detailed understanding of the human body is illustrated in the Vitruvian Man (circa 1490, Galleria dell’ Accademia, Venice, Italy) (Fig. 2) and a sketch entitled “Studies of the Fetus in the Womb”. His anatomical notes have inspired products of biomedical engineering and robotic research in modern times, such as the da Vinci Surgical System in 2000. You can find out more on Leonardo da Vinci’s genius by taking a virtual tour [5].

Polymaths have contributed immensely to various spheres of human endeavors. All of these individuals’ thoughts and practical accomplishments have enhanced lives and partially altered the course of humanity [6]. The famous quotation “Wonder is the desire for knowledge” by St. Thomas Aquinas—who was influenced by Socrates—serves as an inspiration for many of them. They become curious about how and why things work as well as the effects of their actions on others and the environment.

Hermann von Helmholtz (1821–1894) and Albert Schweitzer (1875–1965) are two examples of polymaths from the 19th and 20th centuries. Helmholtz first established himself in medicine, where he investigated optics and sensory physiology and developed the ophthalmoscope, which allowed medical professionals to look inside the eye. He later branched into physics, studying electrodynamics and thermodynamics [7]. Before deciding to study medicine in 1905 at the age of 30 in order to fulfill a missionary’s call to provide healthcare in Africa, Schweitzer was a gifted musician and theologian. He and his wife traveled to Lambarene

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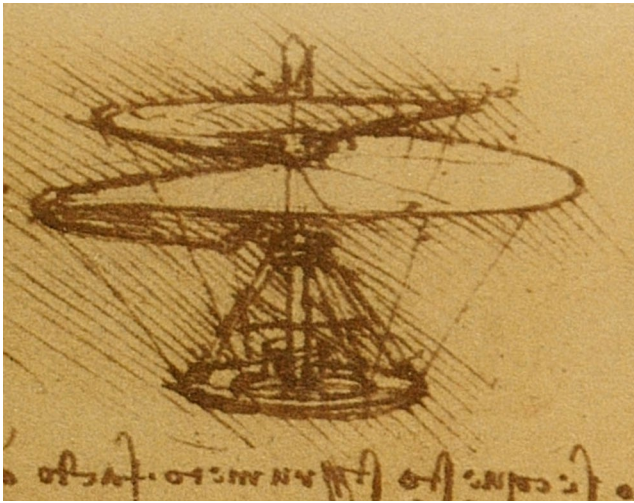
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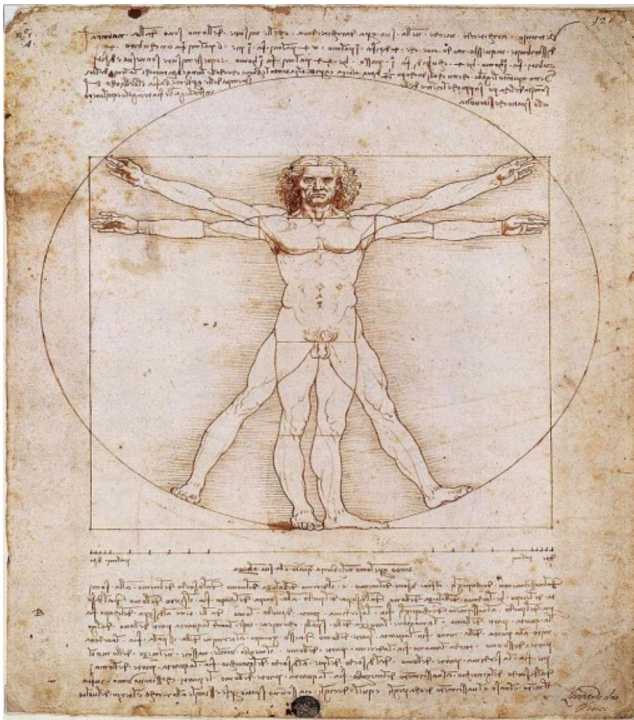
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**Fig. 1** An aerial screw (c. 1489), prototype of a helicopter, from the *Codex Atlanticus*  
[https://en.wikipedia.org/wiki/Leonardo\\_da\\_Vinci#/media/File:Leonardo\\_da\\_Vinci\\_helicopter.jpg](https://en.wikipedia.org/wiki/Leonardo_da_Vinci#/media/File:Leonardo_da_Vinci_helicopter.jpg)



**Fig. 2** The Vitruvian man (c.1490)  
[https://commons.wikimedia.org/wiki/File:Da\\_Vinci\\_Vitruve\\_Luc\\_Viatour\\_\(cropped\).jpg?uselang=en#/media/File:Vitruvian.jpg](https://commons.wikimedia.org/wiki/File:Da_Vinci_Vitruve_Luc_Viatour_(cropped).jpg?uselang=en#/media/File:Vitruvian.jpg)

in the French Congo (modern-day Gabon) eight years after he had finished his studies to establish their first makeshift clinic [8].

Enrico Fermi (1901–1954) is regarded as one of the most brilliant, charismatic, and inventive physicists in modern science. He played a key role in the development of the nuclear chain reaction in 1942. He lived in both the classical physics

and quantum mechanics eras. Fermi was “the last man who knew everything”, well especially in physics and engineering. He was equally brilliant with theory and experiment [9, 10]. Many multi-talented individuals have achieved success in computing and technology in the twenty-first century, including the late Steve Jobs, the entrepreneur, inventor, and investor who created the Apple iPhone, iPad, and Macintosh. Elon Musk is another, the businessman who founded Tesla, SpaceX, Twitter, Neuralink, and OpenAI.

In his book *The Polymath: Unlocking the Power of Human Versatility*, Waqas Ahmed [6] describes polymaths as people who excel in at least three domains. They are able to combine all of their skills into the top 1% skill set. He adds, nonetheless, a probing query: “Every human is born with multifarious potential. Why, then, do parents, schools and employers insist that we restrict our many talents and interests; that we ‘specialize’ in just one?” He continues, “We’ve been sold a myth, that to ‘specialize’ is the only way to pursue truth, identity or even a livelihood. Yet, specialization is nothing but an outdated system that fosters ignorance, exploitation and disillusionment, besides thwarting creativity, opportunity and progress.” The “cult of specialization” may have made scholars forget the wider picture of knowledge acquisition. This results in a lack of invention and originality as well as a poor knowledge of the connections between various fields. It might also result in a lack of sympathy and comprehension for those outside of one’s own sphere of expertise.

Lucero-Matteucci [11] asserts that pursuing interdisciplinary education and research does not lessen the value of specialization. In actuality, existential threats to the planet are unique and call for particular expertise to address them. As a result, collaboration in specialist areas will be stronger if all stakeholders have the same objectives and develop into audiences that are understandable to others outside their field. This enables the optimal use of the available resources to address an issue. It recognizes the connections among a number of issues plaguing humanity, including the links between diseases, unhealthy lifestyle, social injustices, and environmental destruction. This creates awareness on how to build resilience, which does not just involve one aspect, and polymaths may be the first to realize this. When a problem is solved using an interdisciplinary approach, the cognitive and emotional burden of difficult tasks will also become lighter [11, 12].

In our modern society, many conditions are ripe for another “Renaissance” to be led by polymaths. The revolution and disruptive technology of generative AI has created a new global alarm for humanistic existential risk, along with threats of a nuclear holocaust and climate change [13, 14]. The idea of human intelligence itself is being questioned and challenged. If there are enough capable brains

to approach the same problem from several perspectives and points of view, we can address the complexity of such challenges in an effective manner. Collective intelligence is required to address the intricate problems of today [12, 15]. All people are thought to possess an untapped “polymathic state” that is just waiting to be discovered. Our creative potential has not yet been fully realized. The government frequently has to gather “experts” from diverse silos, each with their own distinct set of talents, and get them to work together when there is a national or worldwide issue that needs to be tackled. This was amply illustrated during the global crisis of COVID-19 pandemic [16].

The great philosopher Edgar Morin in his book *Seven complex lessons in education for the future*, commissioned by the UNESCO, [17] urges us to adjust our way of thinking to meet the challenge of an increasingly complex, rapidly changing, unpredictable world. He emphasizes the need of building a ‘sustainable future’. He states in the preface that, “We must rethink our way of organizing knowledge. This means breaking down the traditional barriers between disciplines and conceiving new ways to reconnect that which has been torn apart. We have to redesign our educational policies and programmes. And as we put these reforms into effect we have to keep our sights on the long term and honour our tremendous responsibility for future generations.”

If we want to see a modern renaissance in physics, engineering, medicine, and even in social sciences, creative people from all disciplines must work together to create synergy. A review of the current educational system is necessary for a nation to develop “experts” who are proficient in multiple fields. Policymakers have to ask themselves if they want the nation to have a more broad-based education. And the best way in providing holistic knowledge to students is to start when they are young. Being humans, we also tend to rest on our laurels once we establish success in one field. Therefore, it is crucial to have a system of recognition that encourages polymathism in order to motivate students and researchers to step outside of their comfort zones and collaborate with others to solve real-world problems.

Has a modern renaissance begun? Only time will tell. Meanwhile, do ponder over this “To achieve more, we should imagine together and change. Let us make a difference.” [18].

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#### Characteristics of a polymath

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1. Driven by curiosity/ wonder;
  2. Passionate in learning;
  3. Able to master and synergize knowledge in several domains such as sciences, the humanities, philosophy, art.
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