Making Sense of AI

Monster or Prodigy?

By

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Making Sense of AI: Monster or Prodigy?

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Dedication

To the people who make, and have made, the most sense in my life.

Antonio and Lilita. My parents

Antonio, Raque, Lilia, Jesús, Jorge, Mónica, Marcel, Tere, and Pepe. My siblings

Diana, Eduardo, Manuel. My children

Juan Luis and Erika. My in-laws

Sebastián and Alexandra. My grandchildren

Irma. My love.

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Prologue

Globalization, digitalization, and education have connected people, cities, countries and continents in ways that vastly increase our individual and collective potential. But the same forces have also made this world more volatile, more complex, more uncertain, and more ambiguous. The world has seen a growing disconnect between the infinite growth imperative and the finite resources of our planet; between the financial economy and the real economy; between the wealthy and the poor; between the concept of our gross domestic product and the well-being of people; between what is technologically possible and the social needs of people; and between governance and the perceived voicelessness of many.

No one should hold education responsible for all these disconnects, but neither should anyone underestimate the role that the knowledge, skills, attitudes, and values of people play in social and economic development and in shaping our cultural context. The education of the future should not just respond to societal change; it should help steer society toward a positive future.

What we should expect from schools is to enable the next generation to design new societal, economic and organizational models for a century of unprecedented challenge, to foster human growth through the right mix of cognitive, caring and creative abilities, and to help young people find purpose, meaning and hope in situations of uncertainty.

The most obvious implication of a world that requires constant adaptation and growth from learners is the need to build the capacity and motivation for lifelong learning. We used to learn to do the work,

now learning has become the work. We should not teach students things which they can learn by themselves.

Student agency, the mastery of effective learning strategies and an identity as lifelong learners must therefore form the core of 21st-century education. Agency relates to the capacity to find one's purpose, identify one's intent and translate them into meaningful action. This is not simply about getting things done; it is about doing so with direction and intent. To act effectively, students draw on two essential enablers: adaptive problem solving, which allows them to navigate uncertainty and complexity, and ethical competence, which ensures their choices are guided by values and a sense of responsibility.

Agency and effective learning rely on students being engaged and intrinsically motivated, which in turn relies on understanding the purpose of learning objectives, on being part of the design of learning environments; on mastery, the desire to get better and better at what we do; on relatedness, our desire to feel valued and supported; and on autonomy, our ability to deploy a range of learning strategies in self-directed ways.

These days, it is tempting to see artificial intelligence as a force that steadily erodes human agency. If machines can mimic our abilities and take over our tasks, what will be left for us? Yet this need not be a slow retreat - humans yielding more and more ground to algorithms. At our best, we are far more than the sum of isolated, automatable tasks. We bring together a rich blend of cognitive, metacognitive, and socio-cognitive skills - seeing the bigger picture, making nuanced judgments, designing solutions, communicating ideas, and bringing them to life.

The rise of AI should not diminish this; it should sharpen our focus on it. If routine skills are increasingly handled by machines, then educa-

tion systems must give greater weight to human capabilities that cannot be reduced to code.

Making Sense of AI by Eduardo Andere helps us understand the difference between human and artificial intelligence, between intelligence that develops and evolves over a long adaptive process, guided by consciousness and biology, and intelligence that develops through a short-term mechanical process. His observations have profound implications for what students should learn in a world shaped by artificial intelligence and how we can address the widening gap between the skills that students have and what they need to thrive in a technology-enabled world.

Already the PISA 2018 assessment showed that even in the advanced economies of the OECD just about half of the 15-year-olds were capable of navigating the digital world effectively, for example, distinguish fact from opinion, look at problems from multiple perspectives or integrate different information sources. One could argue that humans have always been better to invent new tools than to use them wisely, but never before had this so direct consequences in the real world. Whereas young people who are connected, hopeful and able to navigate the digital world could become the most significant positive disruptors, young people who are connected but lack basic digital skills and hope are more likely to become negative disruptors.

An intriguing and important insight from PISA is that one of the strongest predictors of a country's performance in digital literacy - ironically - is not how much time students spend with digital tools, but rather whether they still read traditional, long-form books. In the PISA assessment of digital reading skills, students who reported regularly reading books of over one hundred pages consistently outperformed their peers. What this suggests is that the cognitive habits and stamina developed through deep, immersive reading - grappling with layered arguments, following a narrative arc, interpreting nuance - are foun-

dational to digital competence. And yet, as Andere discusses, we are seeing a troubling shift in the opposite direction: away from sustained reading and toward fragmented, screen-based consumption.

Over the past decade, declining literacy outcomes among students have been observed in many countries and Andere illustrates some of these examples. One explanation gaining traction among analysts is that the digital environment is reshaping not just what students read, but how they read. Online, texts tend to be short, fast, and attention-grabbing. Hyperlinks, pop-ups, and endless scrolling encourage skimming, scanning, and clicking - not the deep, focused engagement that builds critical comprehension, analytical reasoning, and reflective thinking.

The consequences of this shift are visible not only in schools but across the lifespan. OECD's Survey of *Adult Skills* has revealed a similar trend: adult literacy proficiency has declined in many countries, while numeracy skills have remained relatively stable. This asymmetry reinforces the hypothesis that the increasing intensity of digital engagement may be subtly, but significantly, eroding the higher-end cognitive skills needed for advanced reading and comprehension. In short, technology is not neutral - it is reshaping cognition in ways we must urgently understand.

This matters profoundly for other areas too. We are entering an age where digital navigation, information discernment, and critical evaluation are essential not only for academic success but for civic engagement, workplace effectiveness, and personal well-being. If the foundational habits that support such skills - like reading long-form texts - are vanishing, we risk not equipping students for the digital future. We are leaving them exposed in it.

For policymakers looking to strengthen digital literacy, the lesson is clear: AI literacy does not begin with devices - it begins with depth. It

begins with helping young people cultivate the ability to concentrate, interpret, synthesize, and reason - capacities that are deeply tied to the habits of deep reading.

This is not a call to turn back the digital clock, but to find balance. Technology can be a powerful amplifier of learning - but only if students are equipped with the cognitive and metacognitive tools to use it wisely. That means protecting time for reading in the school day. It means designing digital learning platforms that reward reflection, not just reaction.

In a world of shrinking attention spans and rising information overload, policymakers have a crucial role to play in shaping an educational culture that nurtures the depth of thought necessary to thrive. The future belongs not just to those who can access information - but to those who can interpret it, connect it, and make meaning from it.

Education in the industrial age figured out how to educate second-class robots. In the age of AI, we will need to figure out what it means to be human, and how we can complement, rather than substitute, the artificial intelligence we have created in our computers. Perhaps the biggest risk is not that AI is becoming human – Andere shows us the profound differences – but that that AI infantilizes us and makes us give up essential human capabilities, trading human autonomy in for convenience. Therefore, tomorrow's education systems need to help students to think for themselves and join others, with empathy, in work and citizenship; to help them develop a strong sense of right and wrong, a sensitivity to the claims that others make on us, and a grasp of the limits on individual and collective action. We should treasure our capacity to think about our own thinking, to navigate complex relationships, to exercise ethical judgment under uncertainty, and to create something genuinely new.

These are not just concepts or beautiful words, they are what education is all about, and they belong to the pillars on which we build our societies. And if education doesn't protect such human capabilities with determination, Andere's analysis suggests that AI could wash away the very foundations of our societies.

Andreas Schleicher, Director for Education and Skills, OECD.

February 2026

Chronicle of the Birth of a Phenomenon

You're about to embark on an intriguing journey into a book that explores the interaction between human and artificial intelligence. This isn't about their history, but rather their confrontation, which leads to changes in how humans interact with machines. New events, companies, players, and products are creating a new normal. While many recent developments, such as generative AI *chatbots*, will eventually become outdated, documenting their emergence and growth provides insight into this evolving technological phenomenon. Like past innovations such as the printing press, radio, television, telephones, computers, Internet, and smartphones, this transformation will reshape human interactions and habits.

Thus, this book explores the "history of the present" and the future—an oxymoron—of AI, as well as its impact on human culture. It is, therefore, a story of how events create patterns, patterns shape trends, and trends form projections. The book, then, is a chronicle of a new phenomenon that some predict will be the birth of a monster that will destroy humanity, and others predict will be the birth of a prodigy that will catapult it.

We are living in a unique moment in human history. For the first time, we are questioning whether humans can create a machine with intelligence superior to their own, with greater analytical, decision-making, and creative abilities. We already knew, before this era, that machines surpassed some traits of human intelligence. Still, we are now, for the first time, confronting machines that engage in conversations with humans, as if they were also human; some people even think that they interact with god, such as "Hi god" (Jackson,

2025). They do so better every day, to the point of confusing humans as to whether they are speaking with a machine or another human or even god.

This technological evolution has turned our world upside down, raising questions that only time will answer. Still, by piecing together the current events, we can visualize where the course will go and what functions and structures will change at all levels of human life, such as the family, school, university, business, and society. After an in-depth review of the genesis of this phenomenon and the findings of some, as well as the epithets of others, and the effects of similar technologies, my thesis is that the machine, no matter how marvelous, will never surpass human intelligence, at least not human intelligence in its most whole dimension. For specific definitions or traits of intelligence, such as data accumulation, accurate memory, speed, and calculation magnitude, machines have already surpassed humans and will continue to do so. However, in a definition that encompasses all dimensions of human intelligence, such as uncertainty, emotions, versatility, total autonomy, self-management, consciousness, and the combination of dimensions that simultaneously play out in the human brain and mind, they have not. As we will see throughout the book, part of the answer lies in the biological essence of human intelligence. As long as artificial intelligence is essentially metal, plastic, and electrical impulses, without flesh, bones, and blood, it will be impossible for it to leap from the world of the things to the world of the living.

That said, AI—in many forms, but especially generative AI, which occupies the bulk of this book—has impressed both insiders and outsiders, experts, and novices alike. And no wonder. Any of us can condense a 100-page book into a one-page summary in under a minute; similarly, we can find information that previously took us days or weeks to compile in less than a minute. Very soon, we won't

even need to browse the Internet with hundreds of options and websites to visit; instead, artificial intelligence, as a portable assistant, will do it for us, perhaps in the form of glasses or a wristwatch. But all this comes at a cost.

Like you, I was also surprised, since December 2022, when I first made queries in ChatGPT, and later in many other long-form language models, such as Gemini, Andisearch, Copilot, Perplexity, and DeepSeek, by the "correct" answers to questions or commands of all kinds. Over time, many of us realized that the answers were not always correct. Reports of AI hallucinations, falsehoods, delusions, and insults began to proliferate, raising the antennas of experts and world organizations to give a teleological sense to the new technological foray so as not to leave it adrift. A maelstrom began, instigated by companies engaged in fierce competition, users demanding more and better products, and governments seeking a compass to chart the path for the new guest at the digital party of the 21st century.

The AI phenomenon is driven or channeled by three forces: the impetus of companies, the curiosity of users, and government regulation. In the coming years or decades, we will experience a dance of some pushing, others inviting, and others limiting. The party will not end, just as it has not ended since the emergence of other phenomena, such as the computer, the Internet, the *World Wide Web* (www), and, in this century, the smartphone. What we are experiencing now is a logical consequence of what was born almost a hundred years ago.

In this maelstrom, I decided to investigate the new phenomenon, specifically artificial intelligence, including *chatbots* and other similar or adjacent technologies, as well as their creators. I dedicated myself to the task of seeking out the best sources of information, reading hundreds of academic, journalistic, and magazine-like articles that would help me understand what was happening, as well as the small steps and great leaps in AI technology. What was the purpose?

To situate myself and make sense of it. Therefore, this book also aims to situate us all in the new era of artificial intelligence and its companions, and to make sense of what is happening and what will happen. Knowing what it is, its limits, its scope, and being able to make decisions about how to use it, what to read, where to look for accurate information, and who the leading players in this super game are, and will be, will allow us to glimpse, before the major functional and structural transformations occur, what will happen with the new reality or the new, future, normal. This will help us prepare ourselves, our children, and our students. Yes, that's right, we are witnessing the birth of a new normal that will transcend generations. It is, therefore, necessary to situate ourselves, to give meaning to the thousands of interactions, promises, and frustrations that will emerge from a fascinating yet troubling technology.

For months and months, I abstracted myself from the everyday world, staying away from the media, the talks, and the travels, retreating into a world of reading and writing on a topic that touches the lives of all of us, but indeed the lives of schools, universities, and businesses, which are trying to understand what's happening to discern what to do. Then, after a few weeks of reading the first specialized literature, I began to organize the topics into a coherent structure. First, I let my hand, with pen and paper (keyboard and screen), lead the way. Then I went to my concept department and organized the paragraphs into sections and then into chapters. In many cases, I asked for help from different artificial intelligence models, which were new to me, and will be for all of us. Just as we used to ask for help from internet search engines and vast data repositories, we will now ask for help from Generative Artificial Intelligence (GAI or GenAI)to locate, synthesize, and organize information more quickly—and perhaps better—what previously took us hours, days, weeks, and months to accomplish. However, all of this was always done with the idea of learning from what was happening, when it was happening, in this world of AI

and other accompanying technologies, to finally translate the dozens of stories that emerged on my desk every day into a classified and sequential format. Thus, I gave my project teleology to illuminate my path and share with you, dear reader, the intertemporal history (another oxymoron) of AI: Where does it come from? Where is it? And where is it going? All of this, using engaging and straightforward language without losing meticulousness or depth. Therefore, you will find hundreds of bibliographic sources, ranging from academic to journalistic and more anecdotal, that support my narratives while also allowing you to pause and delve deeper into specific topics that interest you or require further reflection.

I began this journey to explore the world of generative AI (GenAI). The truth is that what's happening, and what will undoubtedly take shape, is a fusion of several technologies. Therefore, I've also delved, in parallel, into the paths of other technologies, such as virtual and augmented reality, robotics and automation, robotaxis, and intelligent drones. All these technologies are being unleashed and reaching homes, schools, and businesses, packaged in a beautiful and manageable way to whet our appetites. My goal is to present this phenomenon in a way that enables us to make informed decisions about what and how much to consume.

The following pages will serve as a springboard for your exploration of what will be the new everyday life of the years and, perhaps, decades to come.

Note: A previous Spanish edition of this book was published in October 2025 by Siglo XXI Editores under the title "Monstruo o prodigio: cómo la IA está transformando la escuela, el trabajo y la vida." This English version published by EIP has been updated, improved and includes most recent information.

Introduction

What is Artificial Intelligence?

In short, experts define AI as the "set of technologies that make computers do things that are thought to require intelligence when [those things are] done by people" (Heaven, 2024a)[1]. And this is precisely where the name of this technological field, Artificial Intelligence, derives, perhaps inaccurately.

Generative artificial intelligence (GenAI), which comprises most of the work done in this book, is "artificial intelligence systems with the ability to create text, images, and/ or various forms of media through the utilization of generative models. These models acquire an understanding of the underlying patterns and structures within their training data, subsequently producing fresh data that share similar traits and characteristics." (Sengar et al., 2025, p. 23662). Later on another application of artificial intelligence called Artificial General Intelligence (AGI) will be introduced. GenAI or Artificial General Intelligence (AGI) are both derivatives of artificial intelligence.

That said, the thesis of this book is that artificial intelligence, in any form (GenAI or AGI), is not, and never will be, superior to human intelligence. However, there are models of artificial intelligence that have long equaled and far surpassed features of human intelligence. However, these features are not intelligent in and of themselves; they are mechanizations, such as storage and memory, counting, calculations, repetition, predictions, coding, summaries, composition, probabilities, etc. Since humans, despite their intelligence, cannot

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[1]   Author's note: When brackets appear in textual quotations, they are from the author in order to give a better meaning or understanding to the quotation without modifying its intention or essence.

perform these types of tasks with complete accuracy, speed, exact repetition, and without fatigue, they invented machines (and their programs) to empower and free up their brains, precisely in the areas where they needed to do so: repetitive and mechanical tasks. With these, they could engage in various activities, such as resting, having fun, relaxing, playing, inventing, creating, and many more things that machines can't do. Humans created machines, not the other way around.

To put the same idea in other words:

> One of the more robust differentiators involves our unique skill sets. While machines tend to excel at things adults find difficult—playing world-champion-level chess, say, or multiplying really big numbers—they find it difficult (or impossible) to accomplish the stuff a five-year-old can do with ease, such as catching a ball or walking around a room without bumping into things (Gardiner, 2025).

A great demonstration of intelligence is inventing a machine that amplifies human intelligence. For this reason, the first chapter of the book defines human intelligence in comparison to machine intelligence.

We learn in school and life. School helps us transition from the cocoon of the home to the rigidity of society. There, in schools, we can safely fail. The best schools provide us with tools for lifelong learning and help our 3.7 trillion cells live better, longer, and healthier. When we take the final step from school to life in society, we step, for the first time, onto the path of adult life. A life that moves quickly, that never rests, that combines both easy and difficult elements, and both simple and complex ones, and that welcomes us with openness if we do it with effort, productivity, and creativity. Those who left school 100 years ago faced radically different environments from our learning environments, but for their time, they were equally or more

challenging. To begin with, there was no universal access to basic education; automobiles were barely accessible to the elite, schools were largely conventional, and society was highly and completely segregated, both in terms of fact, rhetoric, sex, and law.

Therefore, this book highlights and documents the changes in schools, universities, businesses, and everyday life with the arrival of the newest guest at the party of the digital age: Generative Artificial Intelligence (GAI or GenAI) and other technologies that will help it interfere to boost its growth and that of those different technologies; for example, smartphones, robots, autonomous machines such as robotaxis and many others, smart wristwatches, pins, and glasess, and of course, virtual, augmented, and mixed reality gadgets and programs. Smart drones will also be arriving. In short, it's a game of mergers and synergies, as was the case with the birth and evolution of the iPhone and other smartphones.

One cannot analyze schools and universities in isolation without affecting and disrupting what happens and will likely happen to all of us outside of educational settings as we go through life. One of the significant advances in educational sciences is that, in learning, the dividing line between school and home, university and business, is becoming increasingly blurred to the point of disappearing altogether.

For many of us who grew up in the schools, universities, and life of the 20th century, the cultural and digital context of the 21st century is both overwhelming and surprising, in both positive and negative ways. Only a handful of countries—perhaps the five northern Nordic countries and the southern "Nordic" countries (Australia and New Zealand), plus Switzerland, Luxembourg, and a few others—can boast high levels of well-being, authentic democracy, peace, and social development. For the rest, life is a daily challenge.

Of course, the human population has more than doubled in 50 years, increasing from just over 4 billion inhabitants in 1975 to just over 8 billion in 2024 (World Bank, 2024). This undoubtedly entails an excessive demand for public goods that impact everyone, such as the environment and health. All of Earth's inhabitants witnessed the first global pandemic with COVID-19, which temporarily changed our way of life overnight. However, other silent and less aggressive "pandemics" have permanently changed our habits. I am referring to the cultural changes brought about by the advancement of digital technologies. All of us, regardless of origin, social status, or ideological leanings, communicate and inform ourselves, buy and sell, entertain and indulge, deceive or are deceived, steal or are robbed, with gadgets and their screens. When the Internet and the *World Wide Web arrived,* we gradually but radically changed many of our habits, both in schools, universities, and businesses. These changes, which began sporadically, have created a pattern that will continue to evolve with the introduction of new technologies.

The COVID-19 pandemic drastically changed our habits for a couple of years, at most. Once the situation improved and the pandemic ended, we returned to the previous normal. However, the technological "pandemic" is here to stay. There's no going back to the fax machine when we have email and PDFs; there's no going back to the cathode-ray tube (CRT) television when we have liquid crystal displays (LCDs) or light-emitting diode (LED) displays; nor to landlines when today we have mobile phones that come along everywhere, 24/7, and do many more things than a simple landline or cell phone; or printed Road Maps versus Google *Maps* or *Waze* apps; or popular 35mm film cameras versus smartphone cameras. Therefore, and considering the IA's new technological escalation, it's worth pausing to understand its significance and impact on the current and foreseeable lives of all of us, but especially on the children and young people educated in schools and universities.

Warning

This book is not about the science, engineering, or technology of AI, but rather about how its products evolve, are utilized, make sense, and impact life in schools, homes, universities, businesses, and the daily lives of all of us. Therefore, this book bears witness to this change and takes the pulse of school, university, and even business life around the world. I intend to offer users of AI and other technologies a comprehensive overview of what is happening, from an academic or informed perspective. Like the COVID-19 pandemic, GAI or GenAI in the form of *chatbots* [2] surprised most of us. The tsunami arrived without warning for most of us. At the same time that we would have to continue with the hurried, pressured, and anxious tasks of the 21ˢᵗ century, we would also have to "repair" our ships (homes, schools, universities, and businesses) for the new technological march, more out of a fear of being left behind, displaced, and obsolete than out of an urge to improve the quality of services, learning and life. With this mindset, to help us navigate turbulent waters, I wrote this book, which, among other things, aims to calm the waters so we can swim more serenely and with more vision, without unnecessary haste or anxiety, and make pertinent decisions to improve both the quality of school and university services and to personally understand, outside the avalanche of advertising, the scope of GenAI and other technologies.

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[2]   What is a chatbot? "A chatbot is artificially constructed software that uses natural language as input and output to talk with humans. Chatbots can act as a personal assistant on mobile devices to provide users with personalized information, enable real-time social interaction media, and can even be used in health consultations." (Wang et al., 2021, p. 1). As can be inferred from above, the term "chatbot" predates the public introduction of chatbots, which began with the release of ChatGPT in November 2022.

Contents

The first chapter unveils the concepts of human intelligence (HI) and artificial intelligence (AI). Everyone in schools, universities, and businesses has heard of AI. Still, very few of us expected the tsunami that erupted in November 2022 when the AI company OpenAI introduced its AI model, ChatGPT, to the market. The world was shocked. Investments flowed into companies that were in the AI race. As all chapters will document, the cascade of new products designed for the tastes of a growing number of actual and potential AI customers continued to expand without limits. However, as we will also see, by late 2024 and all 2025, some observers and experts began to highlight a stagnation of the initial enthusiasm. Whatever the outcome of this new foray, a gentle way to initiate the discussion on life in AI is by exploring the concept of intelligence, pitting human intelligence against artificial intelligence. The first chapter begins with a narrative about chess, which has been the quintessential game that has challenged HI for centuries. This beginning is crucial because it marks the vision held 50 years ago about the future of intelligent machines. I close the first chapter with some reflections on intelligence and schools around the world, which will serve as a platform to launch us into a new journey in the world of learning.

The second chapter could not be about any other topic than what many have called "the most successful product in human history." I asked the ChatGPT-4, which at the time was enriched with navigation capabilities and multimodal tools (text, image, browsing, and files), what the most successful product was in terms of sales. GPT replied, the iPhone: Apple has now sold 3 billion iPhones": (Silberling 2025[3]). This fact, combined with the ironic global and academic outcry to limit its use in schools, is a good starting point for the following chapters.

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[3] Source given by ChatGPT in conversation about the "most successful product int terms of sales" held on November 24, 2025.

The most conspicuous way in which AI is reaching people is through smartphone apps and other gadgets. Will AI follow the same path as smartphones? Will AI change the cultures of all of us everywhere, as it happened with smartphones? The answer lies, first, in the chapters that follow, but later and more certainly, in the inevitable passage of time.

Chapter three delves into the topic of GenAI in the form of *chatbots*. The chapter briefly reviews the origin and growth of this fantastic technology that has us all amazed, and how AI hypnotizes us into believing that the *Chatbot's "interlocutor"* is a real person, even passing the famous *Turing test*. The chapter also recounts the explosive growth of LLMs (*Large Language Models*), and the manner and variety with which they reach the public, attempting to overcome the insurmountable challenges of errors, hallucinations, falsehoods, and inaccuracies. But despite all that, the episode also showcases the virtues of the new guests.

The fourth chapter concisely presents the ethical and philosophical debate on AI, with a particular focus on generative AI. Opinions are divided and polarized. Some argue that GenAI, like a benelovent god in the making, will expand human capabilities by freeing us from routine, repetitive, and complex tasks, as both the slide rule and the calculator once did, and later, computers, software, and applications. At the other extreme are the pessimists who, in short, maintain that with AI, the Pandora's box has been opened, like a monster in the making, long before organizations and governments are ready to prevent, control, and eradicate the perverse, harmful, and even catastrophic effects of its use and misuse. I stand in a happy medium, not so much because I adopt the comfortable position of averages, but because the force of technological advancement is unstoppable, and we must find a way to harness it for the most significant ethical and human benefit.

Chapter five explores the intriguing debate about machine consciousness. Are machines capable of thinking the way humans think? Or can machines do certain things, such as record infallible memories, perform calculations at extreme speeds, or predict probabilistically appropriate words based on the words that precede them? Are machines capable of feeling and suffering? Will quantum computing empower machines, but will it make them feel and think the way humans do? Chapter five concludes with a brief reflection on the human response to the renewed impetus of machines.

Chapter six, entitled "The Ups and Downs of AI: What Is to Be Done?", reviews the literature on the misuse of artificial technology and examines the role of AI that seeks to approach human forms, such as cyborgs, *robotoids*, and *humanoids*. To understand the issue of misuse, I briefly reviewed some international efforts to regulate the euphoria, and I provide some examples of AI's failures to place us all within its scope and limits. In this chapter, I turn to the pedagogy of learning for help on some of the actions that schools and universities take to channel the role of teachers and researchers, enhance teaching and learning processes, and deal with human behaviors of plagiarism, deception, lying, and falsehood that have accompanied human beings throughout life and that, like Goethe's Faust, describe the inevitable nature of human beings. This sixth chapter also highlights how international or national organizations specializing in AI, as well as schools and universities, are taking regulatory or policy measures to mitigate, reduce, or eliminate antisocial or immoral behavior.

Chapter seven reviews current events and describes the developments in the world of AI, primarily in the realm of GAI, as well as other technologies such as virtual reality, augmented reality, portable AI assistants, robotics and automation, robotaxis, and drones. This journey reveals a race for niches and leadership that heralds a trend where the tide will settle. One of those niches, and one of the largest, is

education. In this chapter, I present an example from my own learning experience, or how one can autonomously motivate, fine-tune, and improve learning with the help of generative AI. This example serves as a guide to how AI synergize, rather than merge, to enhance various aspects of human life, including learning.

Chapter eight addresses the future of AI and other related technologies. It begins with a futuristic vision of these technologies. Still, it continues with a more grounded, less futuristic but more realistic approach, focusing on what experts expect for 2025 and beyond.

The reality of the 21st century is very different from that of the 20th. Technologies are advancing rapidly, with new products continually emerging and others closing doors. However, various technologies not only follow their own paths; they also merge, creating fusions of different technologies that now unite AI with robotics or biology, intertwining machines with living beings in the so-called cyborgs. In addition to discussing the Next Big Thing in AI, i.e., agents—beyond current assistants—this chapter introduces the topic of Artificial General Intelligence, or AGI. It is a concept also known as superintelligence, referring to the ability of machines to surpass human intelligence. We will learn that what the producers of these machines say when they announce or sell their discoveries, inventions, or improvements is one thing; what they say when interviewed by specialized media, participating in academic discussions, or regulatory environments is another, a much more moderate thing. This contradiction is the source of confusion in the AI message. Therefore, I have dedicated many pages, in different chapters, to carefully elucidating the marketing message from the academic message—that is, what they can do and how far they can go. Like everything, the power of marketing is, in the short term, greater than the voice of academia.

Chapter nine is entitled "The Machine versus the Human," with an everyday perspective rather than an intelligence perspective, as we did

in the first chapter. It primarily addresses the displacement of humans by machines, both in factories and in offices, hospitals, universities, and schools, as well as in services and during medical consultations. Who wins and who loses? Where is the market headed? What skills do companies demand today, and what skills do companies expect to be in demand soon? True, things can change, and new jobs are created and lost as new technologies, methods, and even new consumer preferences emerge. However, the information presented in this chapter documents what experts say companies around the world are saying about job creation and loss, as is currently happening and is expected to continue in the coming years. From these recurring current data, as I mentioned in the preface, patterns, trends, projections, and structural changes emerge. We are witnessing the birth of structural changes, and Chapter Nine documents this.

The final chapter is about lessons. This entire story about artificial intelligence offers valuable lessons for life, parenting, teaching in schools and at home, and provides insights for businesses and governments as well. I will begin by offering some suggestions on how educational programs should evolve, considering the arrival and rapid growth of AI, and reflect on what the future holds for all of us.

The thorny issue is that the surprising way in which AI's commercial launch arrived, but, above all, the rapid way in which it has evolved, literally caused the future to catch up with us sooner than expected. Similarly, just as we had to adapt overnight to working, studying, and conducting business remotely with the COVID-19 pandemic, which began on March 11, 2020, and continued for two years, so too are schools, universities, businesses, and homes adapting to a new reality. What will normality be like in the fourth decade of the 21st century and beyond? It isn't easy to know precisely, but my intention with this work is to lay the groundwork so that whatever the new normal

envisioned and outlined here turns out to be, we will embrace it more smoothly and fluidly.

Therefore, this final chapter concludes with several reflections that extend beyond the labor market itself. They address something more important for the future of all of us: the education of children and young people. In this sense, Chapter 10 asks whether today's schools and universities should change their programs, pedagogy, and teaching methods for tomorrow's world. For example, how can we combine the best and most appropriate tasks for teachers with the arrival of the artificial tutor? For instance, we can also consider whether to continue emphasizing content or focus on soft skills and competencies.

This dizzying shift of the first three decades of the 21st century will also impact parenting and the way mothers and fathers will seek to educate their daughters and sons. Therefore, I close with some thoughts about the future of homes, schools, universities, businesses, and humanity in general.