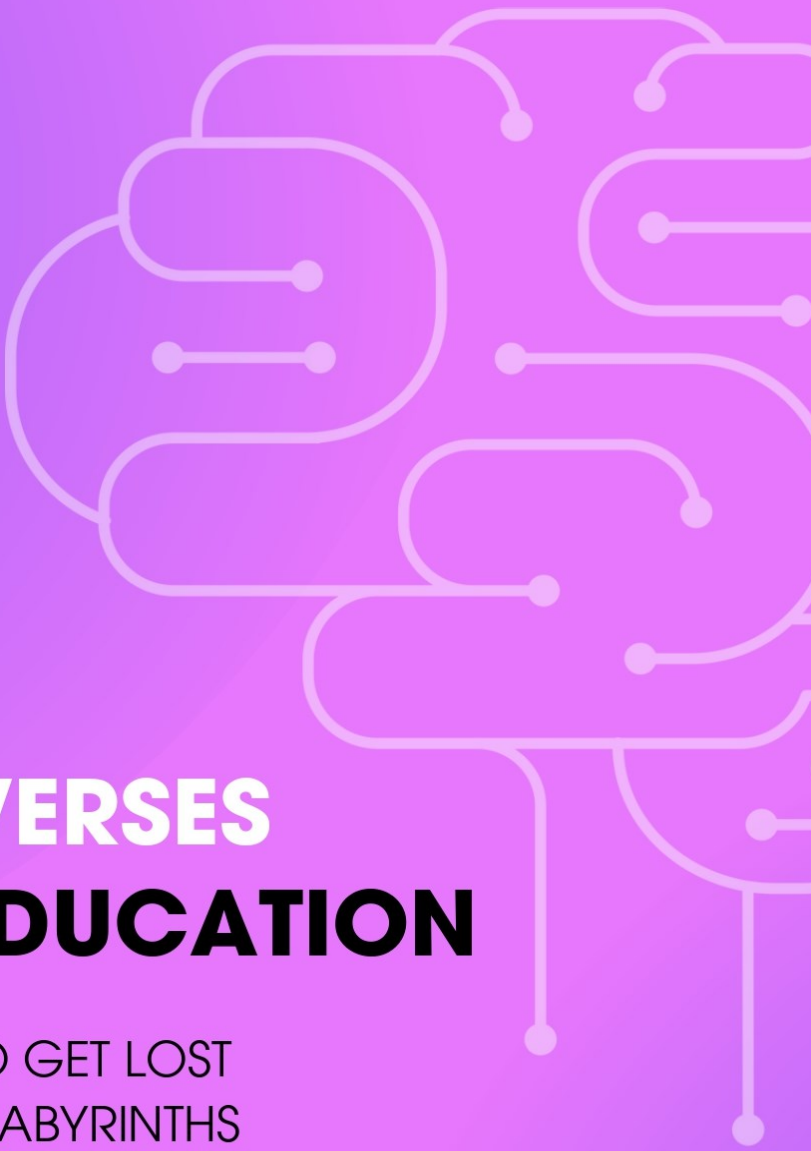
GUSTAVO **DE ELORZA FELDBORG**



METAVERSES AND EDUCATION

HOW NOT TO GET LOST IN THE NEW LABYRINTHS OF **IMMERSIVE VIRTUALITY?**

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Gustavo de Elorza Feldborg

Translated by Ana Inés Cosulich

Proofreading and Style Review: Prof. María Marcela Mendiguren
Instituto de Idiomas
Facultad de Ciencias de la Educación
Universidad Fasta

Graphic Production: Mg. María Eugenia Huinchulef
Secretaría de Investigación
Facultad de Ciencias de la Educación
Universidad Fasta

Cover: Malena Raña. Art Designer

Elorza Feldborg, Gustavo de

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Contents

For Grisel…
You were the person who made me live, smile, and be happy one and a thousand times.
Today, I want to dedicate this book to you because I wrote it inspired by your magic.
Wherever you are, you will be the protagonist of my story, that true love that will accompany me until the last page of my life.

Foreword

It is truly an honor for me to write the prologue of this book. While it is not my intention to provide an introductory synthesis, there are some guiding lines of the author's thinking that I find important to highlight.

Firstly, the title alone invites reflection – the first challenge. The analysis of education cleverly adopts the metaphor of a "maze" indicating a keen observation of the reality faced by educators in the emerging "digital territories" where we must educate the new generations.

Simultaneously, we are presented with the first book on the metaverse and its educational possibilities, a result after the research by a scholar interested in pedagogical innovation. From now on, we will begin to discuss a third immersive territory, and it is possible that the term "metagogy" will become common vocabulary in teaching. However, as the aim is to go beyond expectations, the author invites us to contemplate unavoidable issues that, as educators, we must not evade.

From a philosophical, sociological, and pedagogical framework, I find the proposal to be extremely enriching. Grounded in a strong humanistic approach, in *Metaverses and education* the author presents the "exit from the maze", placing

it in the present and future based on the conception of a "human being" hence illuminating the entire analysis and educational proposal. While the author's previous books, *Revolución del aprendizaje en tiempos de lo digital* [*Learning Revolution in the Digital Age*] (2016) and *Educación, Neurociencia y Nuevas Tecnologías* [*Education, Neurosciences and New Technologies*] (2021), already reference this perspective, in the new work I can observe a deepening of the anthropological approach. In this sense, it is appropriate to ask why so, and personally, I believe the answer is unequivocal, given the scenarios we are currently experiencing and those envisioned on the horizon: transhumanism, posthumanism, artificial intelligence are debates that we, as humans, must engage in.

The author states, "...*there is no possible way out of the maze without an education that liberates and problematizes reality, addressing individuals—in all their diversity—and intelligence—in all its possible manifestations, in all its peculiar characteristics, in all its capacities—, and promotes the respect for their dignity*" (de Elorza, 2023). This constitutes a hopeful invitation since, as educators, in the not-so-distant future; we will likely have to defend the dignity of the human being in our respective spheres of action.

De Elorza´s perspective on education is also very interesting as he criticizes the trend towards pragmatism, immediacy, and a focus solely on results. However, the criticism distances itself from other authors who take positions in "techno-optimism" or "techno-pessimism," relying on a polarized interpretation of technology, artificial

intelligence, and their implications and dangers. Dr. de Elorza proposes a balance—termed "*isorropia*"—that encourages us not to turn our backs on innovation, especially the metaverse and its educational potential. Nevertheless, it also emphasizes critical thinking towards reality, privileging the human over the technological.

As already mentioned, I find this approach extremely hopeful, and at the same time, challenging. The stance is well-defined, forming a vision that is persistent throughout the author's entire thought:

> Proposing a humanized education, even when immersed in technology, mediated by technology, and oriented towards an increasingly technological world, is perhaps a revolutionary commitment amid so much technification at the expense of the human. (de Elorza, 2023).

And I affirm it again because I believe it is the perspective educators must adopt toward education to act accordingly. Because, "*educating will always be a person to person relationship*" (de Elorza, 2023).

Of all the challenges educators face, this is the most important: we cannot know for certain what the future holds, but the context is already taking shape, and we must be prepared. Alongside the author, we were able to enter the maze and emerge from it, although the book urges us to continue thinking.

"*Metaverses and education*" places the thread of Ariadne in our hands; it is up to us to grasp it and project ourselves onto a plan that will prevent us from getting lost in the search for paths, solutions, and exits.

Dra. Patricia Velaz

Chapter 1

Metaverses: The New Digital Labyrinths of this Century

Those who run in a labyrinth are confused
by their own speed.
A long argument is a labyrinth
where truth is always lost.

Séneca

We are in a labyrinth

The technological innovation of these times, together with its features, becomes elusive when we try to define it with words such as "speed", "virtuality", "metaverses", "artificial and collective intelligence(1)", "robots", "transhumanism(2)", "cyborgs(3)", "digital hypercommunication(4)", "cyberculture(5)", the "Information and Knowledge Society (IKS)", "Web 3.0", "Cloud Computing (6)", "Infocracy (7)", among many others.

> Metaverses become the new transformation and evolution of the Internet. People will experience an exodus towards a change in metaphor of the network moving away from models based on 2D screens towards immersive virtual worlds that constitute a completely novel and innovative reality.

If there is something we cannot ignore from reality itself that is the great advances in emerging technologies which are rapidly applied in almost all areas. This speed and the constant advent of innovations in the field, novelties that permeate the entire reality, often cause the sensation of being inside a labyrinth, the impatience of running between numerous streets and crossroads, amid which we try to discover, distinguish and understand the tangle of complexity they represent.

The beginning of this century brought with it the rapid development of new tools, along with new ways of doing and thinking about things in very different ways from what we had been doing before. The logic, access and interactions between the in-person and virtual worlds have changed. Today we are facing new synthetic worlds (Castronova, 2005) [8], also known as "metaverses", which are emerging as the new digital promised land. In the near future, humans may be able to escape from many of the limitations that the physical plane and its laws impose on them. Within these new virtual worlds, people are empowered through the use of virtual reality, augmented reality and, why not, a symbiosis of both, which provide the territories, their spaces and their actions, the ability to emulate and interact with the imagination, not only individual, but also collective, of all those who wander through the immersive experience of metaverses, a kind of “digital swarm” (Chul Han, 2020).

A new technological metaphor

Metaverses become the new transformation and evolution of the Internet. People will experience an exodus towards a change in metaphor of the network moving away from models based on 2D screens towards immersive virtual worlds that constitute a completely novel and innovative reality.

In this sense, almost no activity in which humans are involved today lacks a digital space where they can carry out social interactions. Indeed, all the previous limitations such as time, space and distances, are overcome through these digital spaces.

> The metaverse embodies a maximal aspiration in its name: the total configuration of all independent networks into a single comprehensive system. What could lie beyond the metaverse? For now, we believe nothing. What could operate outside these metaverses? The question is unsettling. The answer is open.

The use of the metaphor of the "global brain", a term coined by Peter Russell in 1982 in his book *The Global Brain*, proves to be very vivid and relevant for describing the internet. Upon that foundational idea, we could speak of the internet as the new global-scale neural digital system, in which its neurons and digital synapses are determined by the functioning of the billions of mobile devices and computers that make up the network, something that enables real-time awareness of events happening at any point of the world (glocality [9]).

The various advances bestowed upon the internet by evolution and digital innovation now allow us to have a "Network of Networks", with global reach, where the service and technological protocols provide users of the network with the possibility of engaging in exchanges, both in the consumption and production of goods, data, information and knowledge. Many of these exchanges are operated algorithmically and predictively by artificial intelligences, solidifying this practice as a permanent future.

We also know, it is an open secret, of the need for a change in the configurations and practices that unfold within the internet, such as the traffic of data and information concentrated by companies and especially by social networks, used in targeted advertising campaigns, and based on detecting what users want at any given moment. We know that this impacts ethical principles in the use of this vast network of information. Currently we can observe the aporia represented, on one hand, by an almost extreme need of people to preserve their intimacy and privacy in "real" social relationships, and on the other hand, by an almost total exhibition of that same privacy through social networks or in the handling of data required for online purchases, in the management of online payments or bank accounts, or in the data that we permanently submit when activating search engines. The times ahead will merit an in-depth discussion, and legislation about the use that large companies make of our privacy, about the trade of data, and about the "best practices" in commercial or political information circulating on networks. This "transparency" that, even without our intention, reveals every aspect of our lives,

raises questions about how much it benefits us or to what extent it harms us. What will life be like in society when every detail about us turns visible, as on a dissected plane, because it will no longer be possible to stay outside this neural system?

This true change of era was recently introduced in society when the technological conglomerate known as “Facebook”—which controls the digital social world—decided to undergo a Copernican turn to its entire technological approach. The company announced a change of name and possibly configuration for the coming years in one of its star networks, which is not highly considered by newer generations, such as Facebook.

Most surely, this change will eventually lead to the cannibalization of the rest of the corporation's social networks, such as Instagram and WhatsApp, which will also end up adopting the new name, currently introduced as "Meta".

The Greek prefix “meta” (μετά-) found in the words “Metaverse” or “Metadata”, to cite just a few examples, literally means “beyond” and, in practice, it refers to an abstraction of something of its same category. If we talk about “metatheory”, we will be referring to the theory about the theory, if we talk about “metaverse”, we will be referring to the universe of universes: multiple and different virtual spaces organized and combined in a collaborative way and complementary in their digital geographies. Thus, the metaverse embodies a maximal aspiration in its name: the total configuration of all independent networks into a single comprehensive system. What could lie beyond the metaverse? For now, we believe nothing. What

could operate outside these metaverses? The question is unsettling. The answer is open.

The new digital guidelines that companies like Microsoft, Google and Facebook are pursuing in the short term, and in an unprecedented race, aim to consolidate the infrastructure and operations of metaverses, also known as virtual worlds. But what do these metaverses involve?

Metaverses are the digital expression of new virtual territories, hyper-connected and with a strong digital representation as a "mirror of the physical world". Furthermore, they constitute an environment where humans experience cyberspace as a metaphor for the real world, enriched with technological tools and resources, based on the imagination and collective creation of the users and companies that support it.

Within these synthetic worlds all types of activities may be carried out, much like in the analog world. This includes buying, selling, investing, studying, working, socializing, and even engaging in politics. Of course, all this operated by our digital selves, in the form of an "avatar".

The concept of "avatar" is not new at all; it is a term that comes from Hinduism to designate a deity taking on a mortal form on Earth. Likewise, the use of an "avatar" for new scenarios with virtual representation is defined by the Royal Spanish Academy (RAE) as the "*graphic representation of a user's virtual identity in digital environments*."

The term "metaverse" was first used by Neal Stephenson in his futuristic novel called *Snow Crash* (1992). These new technological territories can interconnect with the real world and complement it in what we recognize today as "hybrid models". This term was ahead of its time, since at that time social internet (2.0) or cyberspace as a process of daily exchange and communication [(10)] did not exist.

> While many metaverses will take time to achieve full operation, it is legitimate to ask ourselves how this will affect the lives of people. Could it perhaps create a new form of existence for human life? We open the game to the deconstruction of our certainties.

Metaverses are spaces where avatars of individuals operate, and it is there where humans can carry out interactive sensory simulations, from anthropocentric and ontological perspectives.

All these changes bring up alternative forms of digital social interactions for people and a new configuration of societies as a whole.

These territories will make up the communicative and transactional technological foundations, and they will concentrate the expression of our daily life in the coming years.

While many metaverses will take time to achieve full operation, we must not neglect understanding the disruptive technology that is approaching and that, as we previously said, forms the basis of the individual, social and cultural interactions of this century. In this sense, it is legitimate to ask ourselves how this will affect the lives of people. Could it perhaps create a new form of existence for human life? We open the game to the deconstruction of our certainties: in a rapidly changing world, questioning our ways of being in the world is, at the very least, necessary, although we believe it will become essential.

Education should not be left out of this exodus towards virtual worlds. The majority of the new generations currently in the process of education are already familiar with these scenarios, mainly through the virtual reality games available in the market. In other words, is there a tangible effort on the part of corporations to provide these children and young people with the territories where they will operate in the near future in their digital lives, which are eminently virtual and immersive?

Metaverses are made up of a combination of technologies, such as virtual reality, augmented reality and mixed or extended reality in contexts of immersive experiences; all of these provide our brain with new neurochemical experiences. If not controlled, these experiences can be addictive, as seen this in the experience of some individuals, particularly young people, who suffer from addiction to virtual games.

Likewise, education must position itself in this scenario by involving these new technologies as priority tools, with

knowledge, understanding and decision-making for their implementation and application from a pedagogical perspective. The goal will be to enhance the educational processes that lie ahead, towards the transformation of societies and based, whether we like it or not, on the guidelines set by emerging technologies that have already reached the point of no return.

> If we take the educational path within the labyrinth that allows us to navigate the virtual, we will undoubtedly meet the logics of rigid structures that have not allowed for a new way of thinking and acting on the true learning needs of people in this century.

It is clear that educational policies must provide all the means, infrastructure, training and capacity building for all teachers in our educational system in response to the upcoming changes. This crucial moment must be understood at a macro level, since no change or progress can be possible solely through the individual efforts of teachers, unless accompanied from the institutional and political levels. Indeed, without long-term public policies, independent of the governments in power, with the necessary allocation of budgetary funds and the implementation of a specific agenda, the change will be nothing more than an expression of wishes. It would be very interesting to reflect, in this sense, on that phrase by Quino that immortalized his famous Mafalda: "*That so much saving on education has made us millionaires in ignorance*."

Borges and his story *The Library of Babel*

Some time ago, the Argentine writer Jorge Luis Borges allowed us to contemplate the existence of a universe composed of a library containing all possible books (*The Library of Babel*, which gives its title to the story). The books are arranged in hexagonal galleries with five long shelves on four of the six sides, galleries that overlook an "abyss" which one ascends through a spiral staircase. The library is eternal, preceding human existence, and the number of books is countless, though not infinite. They are the result of possible and multiple combinations of the 25 symbols that make up the alphabet. Life is understood as a constant pilgrimage through these galleries in search of the book of books, the one that provides answers to everything, the one that contains all knowledge. For a long time now, human beings have projected their imagination onto the possibility of creating different spaces in new non-physical realities, where the actions carried out there provide people with experiences that cannot be lived in the analog world. Today, without further ado, what is narrated by the author of this story closely resembles the idea of a mega-library that houses all knowledge and the continuous pursuit of the wisdom of all wisdom. The connection between this library and virtual worlds is possible due to humans' compelling desire to attain new knowledge and live out their projections in realms where everyday constraints do not operate.

What do we find in the labyrinth?

Like any labyrinth, this one presents challenges that test skills, knowledge, and the various ways in which intelligence can operate.

New technologies, their innovations, and disruptions in search of new ways of doing things, in a way, contribute to the difficulties of these labyrinths. In different ways, generation after generation navigates the configurations of interaction constituted by new experiences. For this, humans must keep up with all development, without losing the almost addictive pace of consumer induction, to avoid falling behind and risking becoming obsolete.

The variables that we may encounter as obstacles within the labyrinths can have various dimensions and perspectives, but in this book, I am interested in analyzing those related to education.

> Those who teach and learn are not mere objects for reproducing an existing system; they are not simply "factors" within a production mechanism, numbers in a statistic, whose value depends on their productivity or merely a rank in PISA tests. This dehumanizing model is not that suggested in these pages as a possible way out of the labyrinth.

If we take the educational path within the labyrinth that allows us to navigate the virtual, we will undoubtedly meet the logics of rigid structures that have not allowed for a new way of thinking and acting on the true learning needs of people in this

century. These structures are the ones that hinder reflection on how to progress on the path of transitions and decisions, how our brains learn, and how to respond to the processes of interaction with the digitization of the current world. That is why many people get lost in the labyrinth without knowing which path can lead them out of it, and without understanding that they are lost because they do not know or they lack the flexibility to listen and learn other ways to navigate the alternatives of the new labyrinths. There are didactic and pedagogical experiences that sooner or later lead to the exit of this crossroads we have been in for a long time.

New emerging pedagogies

In attempting to propose a state of affairs in education that we have called a "labyrinth" and a consequent way out of it, we must not lose sight of the fact that we do so considering some key concepts characterizing the emerging pedagogies of this time and the incorporation of a new concept we introduce to society, namely "metagogy" [(11)]. Metagogy involves the approach, reconsideration, and application of pedagogy in relation to educational practices, or in other words, the use of teaching, learning, and evaluation methods through designs, strategies, and goals within new digital territories such as metaverses.

Firstly, it is necessary to distance ourselves from a hegemonic education model that creates subjectivities functional to a capitalist production system. It is not that preparing new generations to enter the world of work is unnecessary—given the drastic changes it undergoes as

technology gains ground—but alongside achieving “situated” education, it will be essential to do so by fostering critical thinking, even critical of the capitalist society itself, in order to avoid domestication that hinders the transformation of the world we inhabit. To think about these issues, it is indispensable to revisit Paulo Freire, whose ideas remain relevant, especially his concept of “banking education” that always serves the *statu quo*. Engaging the community's own knowledge with new knowledge is also a tool for exiting the labyrinth without resorting to the predatory path of epistemicide, a common issue in colonial education, a problem extensively explained by Boaventura de Souza Santos [(12)]. Furthermore, the labyrinth from which we propose to emerge includes an exit that considers the implementation of non-extractive education, a type of education that should avoid objectifying individuals, relationships between individuals, and the relationships between individuals and the world. Those who teach and learn are not mere objects for reproducing an existing system; they are not simply "factors" within a production mechanism, numbers in a statistic, whose value depends on their productivity or merely a rank in PISA tests. This dehumanizing model is not that suggested in these pages as a possible way out of the labyrinth. Instead, it is understood as a form of permanence within it, reinforced by the coloniality of knowledge and power.

In summary, there is no possible way out of the labyrinth without a liberating education, one that problematizes reality, that addresses individuals—in all their diversity—and intelligence—in all its possible manifestations, with all its peculiar characteristics, and in all its capacities—and promotes respect for their dignity. Intelligence, as understood in these pages, is the capacity or ability to acquire and relate knowledge, to think and reason, to navigate in different environments, and to be able to choose among different options in all aspects of existence. The multiple "intelligences" proposed by Gardner in the 1980s, in our view, are nothing more than multiple expressions of the same and unique intelligence that should be understood as a dynamic process and not as a given reality. There is no possible way out if we do not move away from the neoliberal productivity model that only measures results—results in relation to the economic aspect—leaving aside many individuals who do not meet the predetermined standards. Subjects of education, not objects. People, not numbers. Diversity, not uniformity. Problematization, not uncritical acceptance.

There is no possible way out of the labyrinth without a liberating education, one that problematizes reality, that addresses individuals—in all their diversity—and intelligence—in all its possible manifestations, with all its peculiar characteristics, and in all its capacities—and promotes respect for their dignity.

Is there a way out?

Many are the years and many are the voices calling for a change in education. Numerous are the perspectives and the countless infertile and confusing discussions of possible solutions that fail before seeing the light of implementation. A multitude of these ideas, concepts, and proposals have become a kind of dystopia, envisioning a possible scenario without solutions and with obsolete educational models. These positions cling to the traditional, to the repetitive, ultimately to an education that does not invite, that does not transcend knowledge, that does not enjoy learning, and that condemns us to remain lost in the labyrinth of apathy and the senselessness of why we educate and for whom we do it.

Notes

(1) Since the middle of the 20th century, there has been experimental research that proposed that computers, those old electronic valve computers, were capable of learning, creating and even thinking. From very early on in Computer Science, the possibility of building increasingly intelligent systems was studied. For machines to be considered "intelligent" they must be able to have complex abilities. Artificial intelligence, then, is the ability of a machine to manage human-like capabilities, such as rational thinking, creativity, planning and even learning.

(2) Transhumanism is a philosophical, bioethical and cultural movement that proposes the improvement of the human condition through science, applied reason, and technology, not only to delay aging but also to improve intellectual or physical abilities. It is not only the possibility of avoiding different disabilities that arise throughout life but also of optimizing those capabilities or virtues that one already has. Transhumanism poses a major bioethical dilemma, since it is possible to ask to what extent the manipulation of human beings is ethical, for what purpose it is done and what would happen, then, to those people who do not have economic, social or intellectual means to improve their skills. This optimization is known as "enhancing", and it is developed from four pillars: nanotechnology, biotechnology, information technologies and knowledge sciences. Enhancement is considered by transhumanism as a right; however, it deserves to be discussed philosophically and bioethically.

(3) Intimately linked to the concept of "Transhumanism" is that of "Cyborg". As the biological sciences and the human and social sciences advance, there is greater awareness of the obsolescence of the human body, that is, of its limitations, not only due to mortality or illness, but also because human beings have limitations, regarding, for example, machines. A Cyborg can be understood, then, as a hybrid between organic matter and technological devices (cybernetic), in search of improvement or avoidance of limitations. Underlying this conception is the philosophical idea that the body is to a certain extent a "prison" (it is not a new concept, we already find it in Gnosticism or in Plato), that the human being is in some way "prisoner" of his limitations, and that, therefore, it is imperative to transcend them.

(4) As regards the so-called "hyper-communication", that is, communication taken to the paroxysmal extreme, it must be said that it is also a communication that can disregard the desire or intention of the subjects of communication. It is a communication that is imposed and is characteristic of this time. Now, more and more thinkers are warning about the possible "collateral damage" of this kind of compulsive communication. Byung Chul Han, for example, warns about the paradox that hyper-communication establishes contacts and destroys relationships, eliminates distance, but destroys closeness.

(5) The use of ICTs (Information and Communication Technologies) in all aspects of social life, the revolution in communications –no longer measurable in "centuries" but literally in years, due to the rapidity of the changes it imposes- globalization as a phenomenon driven by the interconnection enabled by technology, the shift in concepts of time and space, biotechnology, etc., permeate culture as a whole, transforming and influencing it at all levels. Due to these circumstances, one could speak today of "cyberculture", just as one speaks of "cyberspace", which is the locus where this cyberculture takes place. Cyberculture is indeed a new cultural order emerging from the new paradigm.

(6) "Cloud computing" is a system on demand, through which companies or individuals can access resources, such as data or computing services over the internet, without having to store or manage the resources on their own computers. It is a way of democratizing access to resources and services in a territory that is constantly subject to changes and evolution. It enables cloud storage on one or more servers in a virtual manner and also provides remote access to resources, programs, or services.

(7) The concept of "Infocracy" was proposed by Byung-Chul han in his eponymous book. In it, he describes a total paradigm shift that all societies and democracy in particular, are undergoing in this era of communication and information. Political campaigns, electoral processes, government actions, programs, ideologies-all are discussed in the new virtual territories. Far from being a promising scenario, Han observes that, instead, it constitutes a threatening reality. Information wars, cyberbullying, a maelstrom of data, fake news, hate speech, manipulation of public opinion, and so on. To this democracy permeated by these phenomena, Han gives the name "Infocracy".

(8) The author, an analyst of virtual games like "Second Life", explains that these games are more than just entertainment tools. They are true fantastic

alternatives to everyday life. In this sense, analyzing them involves an effort of philosophical and sociological reflection, not only to unravel their success (why people are so inclined to create a "parallel life, what happens in the "real life" that makes this "parallel life an alternative), but also to understand what aspects of these fantastic perfect societies can be emulated in reality. Castronova argues for the existence of "synthetic worlds" in the fact that the creation of these fantastic worlds has economic, social, political, etc., consequences in the real world. They are "synthetic" also because their boundaries are permeable: "in cannot be completely sealed; people are crossing it all the time in both directions, carrying with them their assumptions of behavior and attitudes". (Castronova, 2005)

[9] The interweaving of the global with the local. A realm in which the global becomes localized.

[10] It is not a rarity or a novelty for literature to anticipate times. Science fiction, indeed, is not a fantastic or marvelous literature (according to the classification established by Tzvetaan Todorov) but rather starts from a real fact, however minimal it may be, and leads it to the extreme of its possibility. Through this resource, it offers the creation of utopian or dystopian worlds, depending on whether one trusts in the progress of science or believes that the progress of science and the world in general leads to destruction.

[11] de Souza Santos, B. (2017) *Justicia entre Saberes. Epistemologías del Sur contra el epistemicidio*. Madrid: Morata.

Literature cited

Borges, J.L. (2016) “La biblioteca de Babel”, in *Ficciones*. Buenos Aires: Sudamericana.

Byung-Chul Han (2020). *En el enjambre*. Barcelona: Herder.

Byung-Chul Han (2022). *Infocracia. La digitalización y la crisis de la democracia.* Madrid: Taurus.

Cáceres, J. Cibercultura, ciberciudad, cibersociedad hacia la construcción de mundos posibles en nuevas metáforas conceptuales. *Estudios sobre las Culturas Contemporáneas*, vol. IV, no. 7, June, 1998, pp. 9-23. Universidad de Colima. Colima, México.

Castro-Gómez, S. and Grosfoguel, R. (comp.). (2007) *El giro decolonial: reflexiones para una diversidad epistémica más allá del capitalismo global*. Bogotá: Siglo del Hombre Editores.

Castronova, E. (2005). *Mundos Sintéticos: El negocio y cultura de juegos on-line.* Chicago: University of Chicago.

De Souza Santos, B. (2017) *Justicia entre Saberes. Epistemologías del Sur contra el epistemicidio*. Madrid: Morata.

Escobar, A. (2005). Bienvenidos a Cyberia. Notas para una antropología de la cibercultura. *Revista de Estudios Sociales* no. 22, December 2005, 15-35.

Martínez Ojeda, B. (206). *Homo digitalis: etnografía de la cibercul tura*. Bogotá: Ediciones Uniandes.

Quijano, A. (2000) "Colonialidad del poder, eurocentrismo y América Latina". In Lander Edgardo (comp.) *La colonialidad del saber: eurocentrismo y ciencias sociales*. Buenos Aires:CLACSO.

Russell, P. (1983). *The Global Brain: speculations on the evolutionary leap to planetary consciousness*. Los Angeles: JP Tarcher.

Stephenson, N. (1992). *Snow Crash.* New York: Bantam Books.

Vásquez de Águila, J. Postigo Solanas, E. (2015). Transhumanismo, neuroética y persona humana. *Rev. bioét*. (Impr.). 2015; 23 (3): 505-12.

Vives-Rego, J. and Mestres Naval, F. (2012) La convivencia con los cyborgs y los robots: consideraciones filosóficas, ético-morales y sociopolíticas. *Ludus Vitalis*, vol. XX, no. 38, 2012,pp. 215-243.

Chapter 2

The Road Stubbornly Forks in the Metaverse

There will never be a door.
You are inside
and the castle encompasses the universe
and has neither front nor back,
nor external wall nor secret center.

The labyrinth, J. L. Borges

Almost like a whispered secret, and imperceptibly for many, technologies and especially the consolidation of new digital territories (which operate like black holes, swallowing and building mirrors of the physical-analog world without restraint in their metaverse appetite) are advancing in unthinkable ways, even for the world of education. Today we feel the sensation of having around us something like a

> For the most part, teachers cannot transform their educational practices according to the new demands : in the best of cases, they are only gradually becoming aware of being inside the labyrinth of transformation that this century and its societies demand of its digital nomads.

labyrinth of bits and algorithms, being unaware not only of its external limits and borders but also of its internal paths, its center and its periphery. We are traversed by capabilities, competencies and knowledge, that we may possess or that we realize we must obtain to manage ourselves, even minimally in this new global reality of *brainets* (12) in which we have to live. For the most part, teachers cannot transform their educational practices according to the new demands in order to find that door which Borges describes: in the best of cases, they are only gradually becoming aware of being inside the labyrinth of transformation that this century and its societies demand of its digital nomads.

The new immersive digital interactions (metaverses) are advancing in their consolidation and disrupting all areas of human activities: not only the work and economic spheres but also leisure and recreation, social relationships, and inevitably, education and pedagogy. This revolution is based on interfaces of a future-present scenario that links brain and computers in all their forms and connectivist expressions, and giving rise to emerging knowledge such as neuroeducation, neurotechnology, neurorights and neurosecurity, among others. The change is so profound that it exceeds the mere transformation of existing structures. It is, without a doubt, a new paradigm -to use Kuhn's vocabulary- that requires a new epistemology. It is a new paradigm because the “puzzles” -as Kuhn calls them- faced by thinkers and scientists can no longer be solved with theories, assumptions and theoretical frameworks of the past. This boundary and frontier stage, where old resolution schemes are no longer functional in the face of the “anomalies” that arise,

constitutes a period of crisis in which the need for a paradigm shift becomes visible. And here the revolution emerges.

Even though the digital revolution is already before our eyes, there are still many teachers who try to solve the current puzzles with the old paradigm, and there lies the true labyrinth in which they try to carry out their pedagogical work with no success due to the lack of training, to obstacles in educational government systems, to not having the financial income to face the new demands that arise, or due to the absence of innovation. An education that keeps looking at itself in the successive mirrors of the labyrinthine galleries, content with not colliding against the walls, will condemn future generations to being outside a world that has already changed and that, of course, will continue to change at a vertiginous rate.

The myth of the cave in today's metaverses

Since childhood, those people were chained in the innermost part of a cave, compelled by confinement and shackles to always look forward, without the slightest possibility of turning their heads. Behind them, the entrance of the cavern exists, but they cannot see it. They are unaware of its existence. Nearby, and always behind these people, a fire is burning, casting ghostly lights onto the walls, at least on those visible to the prisoners. Between the fire and their backs, as if on a catwalk, other people parade carrying various objects, including some iron and wooden sculptures shaped like humans. The chained people witness the images and shadows passing before their eyes, projected onto the cave's back wall by the effect of the fire and

the walkers. They are ignorant of what the back wall is: it is all they see. Some talk while they walk, others remain silent.

The prisoners hear voices, but they deceive themselves; they believe the shadows on the wall produce the sounds. How could they think otherwise, as it is all they see and have always seen, habituated as they are to that captive life? Unexpectedly, one is released and forced to look towards the people walking behind. There is the fire with its gleaming flashes of light. The sudden and profound change blinds him, dazzles him.

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He does not know what light is, nor does he know what shadows are: he is used to living in them, he cannot distinguish them from anything else. And people and their objects? He is puzzled. Reality for him is what he has always known. But his uncertainty does not end. He is now taken out of the cave and the natural sunlight hurts his pupils. What is all this that he sees? Gradually, he adapts to his new illuminated situation, but it is difficult, it is painful. Now that he understands that he only knew reflections and that his knowledge was so limited, now that he knows like he had never before, he can no longer return to living in chains. But what about his fellow prisoners inside the cave? A reasonable doubt assails him: they would never

believe him. What's more, they might even want to kill him if he tried to lead them outside as he had been led. What would he do then?

This allegory imagined by Plato rests on the conviction that there is a "world of ideas" of which the sensory world is a mere reproduction. The idea that follows from this conception of reality is that the senses deceive us and there is a need to doubt them. Now, this is not the place to discuss whether Plato is right or wrong at this point. Centuries of philosophy still engage in that debate. The interesting thing about this allegory crafted by Plato is the possibility of being analyzed from different perspectives. For the purposes of the topic at hand, this image of people inside a cave seeing only appearances is, indeed, very protean and very appropriate to illustrate the moment we are living immersed in the new virtual territories and, specifically for educators who must navigate within them without being very sure whether they see the shadows, or the passing people, if they see the stone and wooden figures or if, fortunately, they have managed to exit that cave.

Plato was sure that truth existed and that it was possible to escape deception, to be enlightened, to see reality, to discern, to know. What do we believe?

We can think about the world of education in its day-to-day life assisted by Plato in this case. An old paradigm acts like shackles and chains: it is what we know, what we domesticate -and at the same time, that which domesticates us-, what we normalize as the only and the best, and apply -with greater or lesser success, with greater or lesser vocation, with greater or

lesser demands, with greater or lesser expertise. The changes and demands of these new times work from the outside, stretching the need for us to look face the fact that there is another reality beyond the shadows on the wall, and urging us to awaken to the inexorability of this change. The new model that pushes from the outside constantly asks for an education that proposes the need to teach thinking, through actions of critical thinking, by using types of thinking that will enhance praxis and spaces of understanding. This can be a liberating experience, a truly liberating education, not only for those who learn in a different way but also for those who teach in a different way. There is a double liberation from the problems and limitations that this cave generates: that of the teachers confined in an old and obsolete paradigm amid a world that has definitively changed, and that of the students, who need to be educated for this world and with the tools of this world. The question that arises here is: how can an education –with its procedures and methodologies developed within a cave and tied to limitations, outdated and without much significance- discover the birth of a new century with its evolutions and new perspectives?

The question that arises here is: how can an education –with its procedures and methodologies developed within a cave and tied to limitations, outdated and without much significance- discover the birth of a new century with its evolutions and new perspectives?

Indeed, can the so-called “new technologies” be called “new” when they have been among us for so many years? Perhaps they could rather be considered

"new" as they ceaselessly change and evolve minute by minute in this "precipitation of time" they have been causing since their appearance. This new perception of time they impose also indicates the urgency and imperative need for educators to embrace these changes with the immediacy dictated by necessity: so that the changes do not leave us irremediably behind. When these ever-new tools are used and presented empowering forms of learning for a brain that learns, they enable our students to thrive in these new digital territories (metaverses), which have their figurative expression outside the cave of our exemplification. Will we be able to abandon our usual educational and pedagogical forms? Will we dare to abandon the false security and comfort of the world which is familiar to us, whose deception lies in maintaining forms of control over the shadows of an education that does not liberate and that, moreover, reinforces people's cognitive limitations?

From the known to the new. A journey that requires attitude

Getting out of the shadows of the traditional towards the clarity of innovation is always a difficult process and at times even uncomfortable. It involves abandoning the old, the familiar, the secure, and also releasing deeply internalized beliefs operating as constraints in our ways of being, thinking and acting.

We are not proposing an absolute determinism, but, rather, the existence of what Bourdieu called "fields" as external structures -and the school system would be one- that produce

us socially, and of "habitus", that is, those structures that we have internalized and that even provoke the perception schemes with which we apprehend the world and develop in it. Bourdieu thinks there are structures which structure us. Even though these categories are designed to explain social relationships and the place we occupy as individuals in society, they help us understand, or at least analyze, the reasons that could explain some inertia we have and uphold in fields like education, to such an extent that we may accept them as "normal", "common sense" without even considering the need to reflect on them or problematize them. From these pages we ask ourselves: Is it possible to break free from these inertias? How can they be changed?

One of the core challenges aims directly at the traditional conception of education in one of its fundamental pillars. Will we be able to get out of the "common sense" and rethink presentiality? These days, the openness to new ways of operating education challenges us to explore hybrid territories, made up of in-person procedures, but complemented with virtual ones in contexts of digital, immersive and interactive ecosystems, such as metaverses are. In its initial form, this technology brings along a "metagogy", that is, a pedagogy which is contextualized with meaning and

> Not engaging in getting to know, navigating, understanding and even coexisting with metaverses will be like the mistake of trying to fly out of the labyrinth created by Daedalus, without taking into account the heat coming from the sun.

significance in the possibilities of metaverses. The concept of "metagogy" that we propose in this book is based on prospective sociocultural scenarios that are permeated by infotechnologies, in the development of new forms of immersive social interactions, and by forms of communication between humans and digital interfaces of information and knowledge. Its central practices will be established around creativity, learning networks, design thinking based on agile methodologies and within the integration of new synthetic worlds mirroring physical reality. Students will then truly experience an active and protagonist learning demanded by the experiences within these worlds which enhance neuroperceptive capacities, in a kind of exo-brain that merges with our biological brain.

Access to this type of innovation is a costly and uncomfortable process that involves letting go of old habits and structures towards a true transformation of education and teaching practices to improve the human condition of learning.

The metaverses are in their early stages, there are still a few years for them to solidify their positioning, accompanied by collaborative forms of artificial intelligence with mastery of the immersive virtual world. Much of what will happen in the future will be related to the new territories and their configurations, which will enable the enhancement of social development for humans and their activities in physical reality. Of course, there needs to be a serious and profound debate about the opportunities, benefits, disadvantages -and why not threats- of the coexistence between the real and the virtual, the human and the trans human, without ignoring that the main hypothesis of transhumanism considers that "the human body is an obsolete

device", a concept that Raymond Kurzweil proposed many years ago, in his book *The Age of Intelligent Machines* (1990). Education must take on the role of a cognitive scaffold that teaches us architectures of virtuality supported by disruptions proposed by artificial intelligences, in a kind of symbiosis from which, however, humans do not lose control. It will have the difficult task of traveling through a narrow path: to adopt and adapt to new paradigms and at the same time promote the humanization of methods, content and forms, going against the current of possible dark intentions and possibilities of generating an increasingly more mechanical and dehumanized world where "*relationships are replaced by connections and what now prevails is acceleration and transience. Do everything quickly and let it go as soon as it arrived*" (Chul Han, 2017), which becomes an attack against permanence.

The projection as regarding the development of metaverses implies an initial stage of design, implementation, configuration and launch that will take around ten years until energy factors can be resolved at a planet level, and awaiting the emergence of new network architectures and computational devices with immense processing speed. This also relies in the consolidation of 5G and 6G technologies and their global evolution. Nevertheless, it is expected that within the next five years, the majority of companies, institutions and organizations worldwide will already have some form of a metaverse in its early stages. Then agreements and new techno-socio-economic developments will follow crystallizing the political guidelines and frameworks in which humans will take advantage of the benefits.

In these virtual, mirror-like, labyrinthine, immersive worlds, virtual and augmented realities provide a new mixed neuroreality created by the interaction of both worlds mediated by neuroprosthetics (devices) that extend perception and enhance emotions and feelings of the new digital Icarus.

Not engaging in getting to know, navigating, understanding and even coexisting with metaverses will be like the mistake of trying to fly out of the labyrinth created by Daedalus, without taking into account the heat coming from the sun. In other words, it will be a matter of time before the wings of information and its superficial nature that sometimes takes the place of knowledge, melt the flight, making us rush towards the "society of ignorance". Never before have we faced such information saturation accessible to everyone. It would seem that everything is information. Everything is possible to be informed. Everything is just one click away. There is a "deregulation" of the knowledge market that, while democratizing it, also allows the emergence of stereotypes, biases, distortions and distractions from what is truly valuable and important (Innerarity, 2022). A scenario of these characteristics, possibly dystopian, is always a threat hovering over our future. We have the possibility in our hands to write different endings and take other paths. To stay in the labyrinth or to leave. That is the question.

Notes

(12) Brainets, a network of digitally connected brains that contribute information and knowledge through the potential for interactions in the new digital territories and their evolution towards the metaverse.

Literature cited

Bourdieu, P. (2008). *Cuestiones de Sociología*. Madrid: Akal

Byung-Chul Han (2017). *La expulsión de lo distinto*. Barcelona: Herder.

Innerarity, D. (2022). *La Sociedad del desconocimiento*. Barcelona: Galaxia Gutemberg.

Platón (1992). *La república*. Madrid: Gredos.

Kuhn, Th. (2004). *La estructura de las revoluciones científicas*. México: FCE.

Chapter 3

Alice through the Looking Glass Metaverse

If you really are who you claim, if you really are Time.
Maybe you can clarify this doubt
that I have had all my life:
How soon is soon? (Hatter)

Alice in Wonderland

Are metaverses and artificial intelligence (AI) just buzzwords or are they actually new configurations proposed and shaped by an artificial reality that once again pose us with the Mad Hatter's dilemma in his dialogue with time? It is worth the effort to review some questions about this digital disruption that is approaching and will soon become part of the daily lives and activities of humans.

> Also, it will be necessary to start asking ourselves—but also answering—how metaverses will affect our lives, not only at a social level but also at an individual level, and how this impacts the world of people's training and education.

When we cross over into the mirror world to which we refer, new digital territories emerge. For that reason, we wonder: how real will the emerging artificial reality be where humans begin to connect and inhabit temporal spaces?

With no doubt, in recent years we have witnessed the devouring of traditional forms of social, communicative, occupational, educational, and political interactions by the development of Digital Social Networks which have become the nerve center of our technological activity today.

The topic of metaverses and (AI) is the current trend in conversation today, and undoubtedly, they will become integral parts of our lives, just as it happened with the use of the Internet and mobile phones before that. The term "metaverse" is unquestionably a global trend in terms of internet searches, skyrocketing by almost a hundred percent since the social network Facebook changed its name to "Meta". This rise is likely attributed to a lack of information about this new technology and users' intention to understand the new trends in social, commercial, philosophical, anthropological and sociological issues that lie ahead. It would be expected that education join this direction of investigation, envisioning the new paradigms, in order to start reflecting on the implications of educating next generations in the face of technological changes, the characteristics of the era, and the new patterns of consumption already established in our societies, which serve as cultural compasses and social shapers of our times.

Also, it will be necessary to start asking ourselves—but also answering—how metaverses will affect our lives, not only

at a social level but also at an individual level, and how this impacts the world of people's training and education.

It is also true that it is too early to envision the results of how the metaverse will affect us, but this will not stop us from hypothesizing, even testing different scenarios, considering a prospective anticipation for education, in order to understand the alternatives that digital synthetic worlds offer. Therefore, it is our opinion that one of the main issues to take into account is how our brain will process and adapt to these new technologies or to a hypothetical hybrid life form in which we could find ourselves in the best of two worlds, that is, in a relationship of daily interaction through the combination of physical and virtual realities. In such manner, our ways of being, existing, and acting will have to adapt to the socially connected possibilities based on the development and implementation of human-computer interaction (HCI) software. Is this the gateway to what transhumanism calls H+, which is, the possibility—considered of an immediate and inevitable upcoming—of enhancing humanity in its potentials and virtual limitations? The debate about transhumanism is not simple and it sparks off support and opposition in equal parts. Furthermore, it is the subject of study in bioethics due to the moral implications it may have: What would be the purposes of that enhancement? How would it be used? Who can guarantee that it will not be used for evil? Would it not deepen the differences between those who can access it and those who cannot? Is there not a danger of a new eugenics? Would it not establish differences between people, between lives "worth living" and lives that are not? The questions could be countless, but we just pose some of them in order to raise awareness of the complexity of the topic

and the need to bring about its discussion.

Regarding the possible irruption of metaverses in people's lives –and the pervasive manner in which they will penetrate all social strata and all aspects of life—it is imaginable to determine that endless possibilities will open for human existence. Sorting out the limitations of the laws of physics, enhancing competencies by means of prosthetic technologies, digital implants and various devices seems today a reality that has long escaped from science fiction books to become part of our everyday life. This phenomenon is called “enhancement” as a synonym, not only of augmentation but also of improvement of human capabilities. It may be linked to a concept that is not new, but is still valid: that of “cyborg”, coined early in 1960 by Manfred E. Clynes and Nathan S. Kline to describe a creature composed of organic and cybernetic elements (cyber-organism). In the face of these imminent events, we can either adopt an optimistic or a pessimistic perspective.

Faced with the question of whether metaverses will create a harmful difference between “hybrid humans” and “no+” humans—using these terms to refer to those that have not undergone modifications—it is possible to reply with hope or hopelessness. Ray Kurzweil states that through technology, humanity will surpass all limits imposed by biology in a human/machine convergence that he called “singularity”, which would give rise to an “extended humanity” or “transhumanity”. The “transhuman” is a transforming human, whose capabilities and competencies are being expanded with technology; according to this line of thought, it might be possible to reach a “posthuman”, which is a natural-artificial human whose

characteristics are exceptionally superior to those of current humans. With an opposite point of view, Nick Bostrom raises the concept of "existential risk," and warns about the dangers that technologies can bring to humanity: the emergence of an autonomous superintelligence assuming and performing functions related to power, the rise of a posthuman aristocracy, issues like overpopulation or birth control based on interests, and power used for war purposes.

We do not want to take a position for one or another antagonistic school of thought. We just want to open ourselves to the debate of the ideas that the emergence of the future into the present brings up, a debate that cannot be avoided if we become aware of the impending changes and we aim to leverage them to our advantage.

If metaverses, are used correctly with an educational purpose, they may constitute a true revolution in the ways of teaching and learning within schools and universities. The evolution and transformation they present align with the fact that the foundational development of this technology has beforehand millions of young people who not only are familiar with virtual and augmented reality environments, but are also true specialists in the use of on immersive technology-based video games.

For the metaverse to be used with positive results for teaching, learning and evaluation processes, profound changes must be proposed in the methodologies to be employed, and in the development of teaching practices that should create diverse learning alternatives based on understanding, achieved

through virtual immersion and interaction scenarios, to promote novel forms of motivation among students. It will also be essential to overcome old patterns of content transmission and mere passive repetition - pillars of traditional education- abandoning master classes that many students already perceive as completely outdated and obsolete in contemporary times.

On the other hand, and not less important, the role of teachers must undergo transformation: they will no longer be mere dispensers of data and information, much less transmitters. Instead, the new educational demands within the metaverse will require the creation of ludic-comprehensive spaces for guidance, based on challenges, surprises, investigations, journeys through time and reflective experiences that truly place students at the center of their own educational journey. Of course, teachers will have to create these neuro-techno-spaces, which will require a strong knowledge and solid experience in navigating the metaverse. To achieve this, institutions should allocate investments for equipment, training, and education with the core objective of providing universal access to these

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technological environments. Therefore, we understand that it will take time to shape and implement educational policies to guarantee these practices and to recognize students as subjects of rights with access to emerging technologies, to all forms of connectivity and their benefits.

We cannot ignore that major technology corporations invest large amounts of money in the consolidation of this parallel virtual reality, and that today they are actively analyzing perspectives and their multiple symbolic representations tailored to the needs of markets and individuals. Likewise, they also seek to offer ways to connect us through various digital means and resources, following the metaphor of the shadow, which suggests that "information follows us wherever we go". In this way, metaverses will always provide us with a continuum [13] that will favor the possibility of shifting between the virtual and the physical realms and vice versa.

It is worth noting that the educational possibilities of metaverses are immense: they allow visits to museums, historical tours where time is not a determining factor of the experience, journeys to solar systems and planets, all of which also conceivably enhanced by artificial intelligence. You can bring back to life any dialogue and interact with different characters of history, recreate geographic territories and explore them as an adventure. We must not fail to mention the potential to create simulation scenarios of all types to provide answers to countless educational needs. One of the advantages of these scenarios is that they can be very safe when suggested as educational activities, since they will not be exposed to

dangers or limitations that they could represent in the physical reality.

Avatars, the expression of our digital self

One of the fundamental differences between Science Fiction and Fantasy Literature is that the latter has a fantasy base and does not leave that realm (to venture into what cannot be in the real and acknowledged world). This fantasy is lived by the protagonists with stupor (as in the tales of Edgar Allan Poe) or with naturalness (as in the Harry Potter saga). Meanwhile, Science Fiction has the peculiarity that it starts from a real, knowable fact, something common in the real world, and stretches it forward, into the realm of the fantastic, the possible but not yet real. If what is obtained at the end of that journey relies on trust in the future and in science, it will be a utopia. Otherwise, if what is achieved exudes distrust and discontent, the resulting scenario will be that of a dystopia.

In 1992, Neal Stephenson wrote *Snow Crash*, a Science Fiction novel. Its title refers to a failure, a malfunction in Apple computers, and the story it narrates is about a pizza delivery driver in the real world who is a samurai in the virtual world. The novelty introduced by the author is the possibility of living parallel lives in a virtual world that he called "metaverse" (a name that endures to this day). The second identity - the alternative identity- of each individual in that "metaverse" is referred to in the novel -and for posterity- as an "avatar". The word "avatar" is taken from Hindu culture, where the god Vishnu has the ability to incarnate when necessary, and these

incarnations are called “avatars”.

> In this liquid society of uncertainty and change: what would it be like to “educate”? Educate for which society (if it is permanently changing), in which values, for what world?

On the Internet, an “avatar” is any object (image, drawing, photo, animation, design) that represents the user, and through which that person interacts in virtual environments. Joining a virtual community, regardless of its nature and purposes it pursues, allows the “construction” of an alternative identity to engage in the community interactions. The virtual identity may exactly respond to the real identity of the user, or it may be a totally different one. Each user can even adopt different “identities” depending on their interactions in different communities and scenarios, in a dynamic and continually renewed mode. In constructing this “avatar”, individuals seek to highlight traits that they find relevant or strategic for their objectives in a particular interaction; likewise, they may choose to make invisible other aspects assumed to be unimportant or directly contrary to the proposed objectives. The construction process does not end in these two movements (visibility/invisibility), since the “avatar” can be constructed directly with elements that do not correspond to reality, in a tactic that clearly hides the real identity and creates a new one. Spanish philosopher specialized in Philosophy of technology, Eurídice Cabañes (2021), refers to this process as one of “disembodiment”, in which “inessential” identities are created in a “simulacrum” (14).

However, Cabañes considers that this identity creation, freed from the constraints of corporeality and promising freedoms from certain prevailing matrices in the real world (stratified identities, stereotypes, regulated social expectations), in practice demonstrates that the industries behind virtuality drag "in their developments, the symbolic universes of their culture". Therefore, it is to be expected that these "avatars" are to be conditioned by the same matrices that shape subjectivities in the real world (for example, the performative demand for aesthetic standards).

As we mentioned before, the ways to integrate, relate and interact within the metaverses will be for the time being through avatars in their different configurations of style, shape, traits and object representation, whether we believe that they represent us or simply that we choose them for other reasons.

It is important to think about a scenario that is very likely to occur within virtual worlds: our digital selves, digitally incarnated, will maintain interactions with synthetic intelligent entities that will take on the role of tutors or assistants. On the other hand, there will be avatars of other individuals within the metaverses, so it is not unexpected that our digital alter egos will continue to interact with these digital entities even when we are not connected within the same synthetic scenarios.

Digital identity within the metaverses will be a topic to define and establish as related to the multiple possibilities that these spaces and configurations offer to people. Indeed, the entry and interactions allow users to adopt various representations of themselves, which often do not match the

identity they have in physical reality. That is to say, metaverses are a scenario in which people have the freedom to perceive and develop themselves in ways that are different from the real world: sexual identity, age, physical appearance, occupation, studies, preferences, hobbies, family configurations, etc. Everything can be similar to the real world and everything can be different. Part can be similar and part can be different: it is in the hands of the user.

Multidimensional destinations in the Metaverse

Without a doubt, immersive technologies will become phygital[16] or phygital experiences[15] as foreseen by transhumanism, surpassing the limits considered "natural" through technology. These experiences modify the planes of existence, and for this to occur, the boundary between everyday life and digital fiction must gradually give way and become increasingly permeable. That is to say, there will come a time when people will live with one foot on the physical earth and with the other in the labyrinthine realm of multidimensional destinies, where everything or almost everything will be possible, at least on the digital realms.

The emergence of metaverses, imposing their existence as necessary, raises all kinds of questions: first, we seek to understand what the metaverse is about; second, what will be the dynamics of this impending large disruptive technological change. However, there is an even more disturbing question: Why do mega corporations consider that in order to survive,

they must redesign and reengineer their entire structure, investing large sums of money in these issues to accelerate the process and manage to establish themselves within an immersive digital territory? Will this mark the era of a new exodus towards the territories of metaverse?

We cannot ignore that the current times have become a race of speed and obstacles. We have witnessed and continue to live within the scope of the transformation generated by social networks. We are spectators of how they engulf all our data, preferences, choices, decisions, and interests, and how they have redesigned all societies in a general and profound way, managing to impose polarization strategies on people's decisions through operations and forms of manipulation that target the biases of our brain. We should mention the transformation and reconfiguration of traditional media, which replace their informative essence with that based on audience seduction and implemented in the economy of attention, without concern for whether people are informed or not, but with a focus on keeping them entertained.

The writer, philosopher and sociologist Zygmunt Bauman (2010) coined the concept of "liquid" to describe a society that is no longer guided by the rigid patterns and prescriptions of past times. It is true that these patterns may act as corsets that hinder transformation

> What would it be like to live in this "immersive modernity"? What would it be like to educate in it -a topic that primarily interests us- in order to harness those characteristics that, superficially, may seem negative?

and evolution, but more than that, they also function as structuring structures [16] that, in some way, support life in society and even subjectivity. Bauman states we are living times of uncertainty: everything changes, everything expires, everything has an expiration date, and everything is temporary. Solid frameworks have disappeared, giving rise to the emergence of multiple possibilities and, along with them, doubt and uncertainty.

These times are not only times of uncertainty, liquid times -to use the author's terminology- but also technological times, whose influence on society and its configuration is unavoidable. This topic is extensively developed by Bauman in his book *On education. Conversations with Ricardo Mazzeo* (2013). Technologies have a dual character: they allow us to be permanently connected -with all the benefits that this brings- but at the same time they prevent us from "disconnecting" from work and obligations. An example of this is social media, which in a way becomes a trap that we are increasingly caught in because, at what point are these novel and exacerbated social skills proposed by social media not paratizing real, in-person social relationships? In this liquid society of uncertainty and change: what would it be like to “educate”? Educate for which society (if it is permanently changing), in which values, for what world?

Given Bauman’s proposals relating society, technology and education, we could ask ourselves: what would Bauman think about this new reality of metaverses? Perhaps he would talk about a “digital seductive kidnapping” describing a situation in which people will be dragged to spend most of their

lives within these mirror worlds. Perhaps, following Bauman's logic, this would be the new stage of an “immersive modernity”, whose characteristics of uncertainty, mutability, evanescence and ephemeral permanence are intensified and combined -perhaps explosively- with a hyper-technification that permeates all areas. What would it be like to live in this “immersive modernity”? What would it be like to educate in it -a topic that primarily interests us- in order to harness those characteristics that, superficially, may seem negative?

Among the many paths of the metaverse, we will surely encounter some of these experiences. Of course, we are still not sure about the modes, forms, contexts, logics and strategies that will give life to these multifaceted digital ecosystems. Certainly, something will be crucial for humans in their experience within the metaverse, and it will surely lie in understanding, comprehending, and being able to decide when interacting with a whole world of possibilities. In this sense, we propose a model of neuro-techno-education -and its formative processes- which allows us to exert control over these new territories.

> We might ask, then, to what extent and in what way these new relationships shape society in ways that are differently from those ways usual until a few years ago.
> Are these networks really “social” or are they individualistic and hedonistic?

Likewise, in many cases, the paths proposed within the infinite labyrinths that make up these multiple universes and their combinations will invite us (through screens, social networks, apps, and AI assistants) to constantly live within them a certain amount of our time. It will be the passage from the 2D dimension to the 3D expression, where the engines of persuasion -virtual and augmented realities- will make the experience irresistible, something almost impossible to reject. Whoever does not integrate to this life will run the risk not only of disconnection, but perhaps of social non-integration, a phenomenon that will not be entirely new, but rather a *déjá vu* of what is currently happening with social networks and their dominance in societies. The concept and name "social networks" are taken from sociology and refers to the interconnected structure that constitutes social reality to the point of being able to affirm that society itself is a network. Networks are a set of relationships and commitments that bring people together in society, allowing them to give and obtain resources. The social network, then, constitutes the primary social environment of individuals involved in that network and the scenario for their relationships.

What we currently consider "social networks" (Facebook, Twitter, Instagram, among others) are actually, one of the many social networks in which our life in society is "woven". Many scholars warn about the possibility that these new networks displace or replace other networks that are necessary for the development of our life in society. In 2022 [(17)], a study reported that the average use of digital social networks is two hours and twenty-seven minutes per day per person. In Argentina, for example, this average rises to three hours and

twenty-six minutes. The time dedicated to "socializing" on these virtual networks is time that is subtracted from socializing in the other networks, the real world ones. The "relationship" mediated by screens is not the same as the "in-presence" relationship. If we add the various messaging platforms, the rise of e-commerce, the multiplicity of online procedures that can be carried out today (including the formerly inconceivable idea of "telemedicine"), it is clear that the average number of hours a person spends in front of a screen is higher. We might ask, then, to what extent and in what way these new relationships shape society in ways that are differently from those ways usual until a few years ago. Are these networks really "social" or are they individualistic and hedonistic?

The key elements that unfold within the metaverses will undoubtedly be consolidated by the power of an extended reality resulting from the combination of virtual and augmented realities. These will promote the construction of spaces that will allow people to live multiple experiences with other inhabitants of the metaverse, and to have countless interactions with the objects that make up each metaverse. In this way, the metaverses define and will define the evolution of cyberspace, with its characteristics of corporeality, persistence and immersiveness that permeate not only 3D virtual spaces but also interconnected activities, socialization, the world of work, leisure, traversing all social classes.

Just as we started this chapter we could conclude it:

"- Would you tell me, please, which way I ought to go from here?

- That depends a good deal on where you want to get to, said the

Cat.

- *I don't much care where, said Alice.*
- *Then it doesn't matter which way you go, said the Cat."*

How to navigate a balance so that the experience of new forms of life in the metaverses does not become a cyber-addiction to facilitate people's escapist fantasies? Like Alice, we are on our way: knowing where we want to go will involve making decisions about the routes to follow.

Notes

(13) The Word “continuum”, derived from Latin and meaning “continuous”, is commonly used in various field of knowledge to explain a development, typically constant, of something over a specific period of time.

(14) The concept of “simulacrum” was extensively explored by philosophers such as G. Bataille and J. Derrida, but it is in J. Baudrillard where it gains more development. “Simulacrum” is no longer mimicry of reality but is situated in the realm of the “hyperreal”, where the boundaries between the real and the imaginary become blurred.

(15) “Phygital” is an acronym for “Physical” plus “Digital”. It is a concept that arises from the need to name a new reality or a new way of being in reality that has emerged in recent times, where it is possible for the same person to be present both virtually and physically, in the digital world and the physical world.

(16) Pierre Bourdieu

(17) Digital 2022 Global Overview Report

Literature cited

Baudrillard, J. (1988). *El otro por sí mismo*. Barcelona: Editorial Anagrama.

Bauman, Z. (2010). *Modernidad Liquida*. Buenos Aires: FCE.

Bauman, Z. (2013). *Sobre la educación en un mundo liquido: conversaciones con Ricardo Mazzeo.* Buenos Aires: Paidós.

Bostrom, N. (2016). *Superinteligencia. Caminos, peligros, estrategias*. Madrid: Editorial Tell.

Bostrom, N. Savulescu, J. (2017). *Mejoramiento humano.* Madrid: Editorial Tell.

Bourdieu, P. (1997). *Razones prácticas. Sobre la teoría de la acción*. Buenos Aires: Anagrama.

Cabañes, E. (2021). Identidades digitales: del cuerpo-avatar al yo-cuantificado. Retrieved from https://doi.org/10.13140/RG.2.2.10709.86249

Castronova, E. (2007). *Exodus to the Virtual World: How Online Fun Is Changing Reality*. London: Palgrave Macmillan

Castronovo, E. (2020). *Life Is a Game: What Game Design Says about the Human Condition*. London: Bloomsbury Publi- shing

Clynes, M. y Klyne, N. (1969). Cyborgs y el espacio. *Astronautics*, September 1960. Retrieved from: https://archive.nytimes.com/www.nytimes.com/library/cyber/surf/022697surf-cyborg.html

Garrido, L. (2020). *El metaverso explicado: ¿Qué es el metaverso y cómo funciona? ¿Es realmente el futuro de la convivencia humana?* Author's edition.

Kurzweil, R. (2005). *La singularidad está cerca. Cuando los huma-nos trascendemos la biología.* Berlin: Lola Books

Palacios Navarro, S. (2003). Los Avatars: funciones para un alter ego virtual. Retrieved from: https://www.researchgate.net/publication/316427831_Los_Avatars_funciones_para_un_alter_ego_virtual/citation/download

Postigo Solana E. Transhumanismo y post-humano: principios teóricos e implicaciones bioéticas. *Medicina e Morale*. 2009;(2):267-82.

Postigo Solana, E. (2015). Transhumanismo, neuroética y persona humana. *Rev. bioét*. (Impr.). 2015; 23 (3): 505-12

Postigo Solana, E. (2016). Bioética y transhumanismo desde la perspectiva de la naturaleza humana. *Revista Arbor*, 2016

Postigo Solana, E. (2010). Transhumanismo y posthumano principios teóricos e implicaciones bioéticas. Medicina y Ética: *Revista internacional de bioética, deontología y ética médica.* Vol. 21, Nº. 1, 2010, págs. 65-83

Chapter 4

Neuroscience and the Labyrinths of the Metaverse

We are all mad here. I'm mad. You're mad.
How do you know I'm mad?
You must be, or you wouldn't have come here.

Lewis Carroll, Alice in Wonderland

Definitely, the metaverse is causing great enthusiasm: this new technology is advancing at high speed and envisions a world of future possibilities in the movements and coexistence of human beings in virtual territories. Understanding it -and mastering it- is an attractive and necessary challenge that is being imposed in all areas.

As we have mentioned, the concept of the "metaverse" originates from what was proposed by Myron W. Krueger in his book *Artificial Reality* (1983), where he establishes the foundation of what we know as "immersive and interactive systems through the use of virtual reality".

Likewise, a year later, in 1984, William Gibson went ahead of time by laying the foundations of the "Cyberspace" concept in his science-fiction novel *Neuromancer*. Over the years, with the unstoppable development of technology, economy, society and culture, the notion of "metaverse" comes onto the scene and consolidates in 1992 -as we mentioned in other chapters- with the novel *Snow Crash* by Neal Stephenson.

It is clear that these scenarios emerge not without deep questionings -from philosophy, sociology and even anthropology- about what life will be like, and what its meaning will be due to technological transformations. And most of all, how the rules of interpersonal dynamics will be redefined in these new contexts, where mega-corporations will also be playing a role in managing the social interactive implications.

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With the emergence of these new scenarios in which life develops and will develop, it is impossible not to question the nature of reality, or what, until recently, we knew as "reality" (from *realitas*, a quality related to the true or real thing). Do we live in or discover our reality? This is the question that

neuroscience often asks and today we could begin to answer by paraphrasing an idea from the writer Anaïs Nin: “our way of being determines the perception we have of the world since our personality gives us the particular point of view we possess” (Nin, 1981). With no doubt, the possibility of knowledge is an old topic of philosophical discussion, which had an interesting milestone in modern philosophy, particularly in the rationalism led by Descartes. His theory brought about two dominant positions: realism and idealism. From a gnoseological perspective, realism postulates that the object of knowledge is independent of the subject. For knowledge to exist, the duality of subject and object must exist. Therefore, the subject does not create knowledge; instead, there is an intentional relationship in which the preeminence lies in the known object.

In turn, for philosophical idealism, every knowable entity exists within knowledge (Vernaux, 1981); things in themselves are not knowable, and knowledge is not seeing or apprehending, but rather constructing or creating the object.

Why this digression about reality in a book that seeks to navigate the labyrinths of metaverses and their relationship with

> In a short time, we will find societies that will be deeply involved in the development, configuration, implementation and use of these immersive virtual spaces. Therefore, these current and upcoming generations -without hypothesizing too much- will have daily practices, forms and lifestyles linked to the dynamics of these new territories.

education? Just because metaverses, in particular, and new technologies in general, bring to the forefront of discussion the permanence of the concept of reality as we know it until now. "What is reality?" It is a question that we will have to ask ourselves constantly from now on and, at all events, whether virtuality has forever modified this concept.

Following this line of thought, we can assert that when immersing ourselves in the metaverse, our brain perceives its proposals through our reticular activation system, allowing us to initiate actions within subjective realities.

From a prospective standpoint, we can say that the metaverse focuses all its intentionality on providing, through emerging technologies, new environments based on constructions and reconstructions of digitalized spaces. These constructions respond to the preferences and interests that users (real persons) determine from the initial configurations upon entering the metaverse. To do this, metaverses use tools based on virtual reality strategies to then "seduce" an audience by proposing highly empathetic scenarios, thus creating experiences in fictional spaces that seem as real or compatible as possible with what we perceive as reality. In this sense, the metaverse drives actions based on neuroplasticity, activation of memory centers, and reward systems.

These new territories can be identified through their various properties and characteristics such as synthetic, artificial, mirrors, and in their quality of being persistent, possible, and virtual.

Having said this, the question we cannot ignore is how the use of the metaverse can affect education. Undoubtedly, the interest in answering this question lies in the fact that in a short time, we will find societies that will be deeply involved in the development, configuration, implementation and use of these immersive virtual spaces. Therefore, these current and upcoming generations -without hypothesizing too much- will have daily practices, forms and lifestyles linked to the dynamics of these new territories.

So, in the first instance, the topic we must address is providing teachers with training, research and critical and reflective practices on the use and adoption of an immersive neuro-techno-pedagogical perspective. Only in this way can we attempt to approach an education that not only has to reconsider all teaching processes, but also has to address key concepts such as the decentralization of information and knowledge, networked connections with artificial intelligence supports based on learning analytics, educational models conceived and designed focusing how the brain learns, the use of teaching, learning and evaluation devices supported and enhanced by non-human avatars and holograms with expertise in educational topics and mastery in multiple fields of knowledge.

Likewise, the main strengths that metaverses offer in educational contexts consist of educational activities based on digital immersion, and carried out through pedagogical proposals sustained in training through active and experiential learning.

How does the brain interpret virtual reality and physical reality?

We know that the brain organizes its activity, among other things, by working to detect patterns that allow it to anticipate threats in its interaction with the environment. These are risk threats to which the brain reacts by generating conjectures after the signals it receives from the external world, both in the physical reality and in the virtual one. The brain will continue with this biological system of predictive perception, which is always in self-protection mode. This comprises a large complex network of stimuli, memories, and biases operated by various processes that may be understood as a computational system developed to create and understand inferences about signals that the biophysical environment sends from different scenes.

In *Mind Reading. The Brain and the Art of Fiction* (2011), Jorge Volpi explains that the brain does not distinguish fiction from reality,

> *As I hope to describe later, recognizing the world and inventing it are parallel mechanisms that are barely distinguished among each other*". (p. 9)
> "*At a certain level, the brain knows how to distinguish reality from fiction; but, as I stand there, in Tolstoy's Russia or Proust's Paris -while I'm reading- my mirror neurons activate with an intensity similar to what they experience in front of an authentic scenario - novels are also video games*. (p. 67)

Therefore, our brain processes both images (fiction and reality) in the same way, making the former as vivid as the latter.

He completes the idea:

> *When we find ourselves in front of fiction, when we read it, watch it, or listen to it, an analogous phenomenon occurs -for the brain, we know, mental images are always equivalent. I open a novel, I discern the traces the author has left, I complete them with patterns extracted from my memory and I suddenly discover a character -someone like me. Afterwards, the same thing happens: I observe certain gestures, certain expressions, certain postures; my mirror neurons activate; I repeat those gestures, expressions and postures in my mind as if they belonged to me and, in doing so, I finally know what is happening to them - the character is overwhelmed or thoughtful or irascible.* (p. 71)

Hence the fact that virtual reality impacts on our brain. However, we cannot ignore that the basis of our patterns will expand as we engage with metaverses, as they allows us to carry out new experiences hitherto unknown to the human brain and mind, for example, flying, a virtual experience with which we challenge the possibilities of the laws of physics. These new educational potentials will then be based on metaverses, formative experiences focused on the creativity of living within alternative realities.

Similarly, metaverses, which are currently in the process of development, will soon benefit from the computational power provided by quantum computing [18] in relation to increasing the information processing capacity and the expression of its multiple formats, a crucial feature for the rendering process [19] of the three-dimensional virtual and immersive environments in these synthetic worlds.

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Certainly, these logics of programming and projection of digital scenarios will be complemented, in their high-speed response operations, by artificial intelligence engines. One of the main decision-making features will be based on the discrimination and interpretation of emotions, informational postures and facial features of users experimenting within the metaverse, a fact that will consequently enable different actions to possible patterns generated in users' brains, with their corresponding adaptive and configurational adjustments in the metaverses.

Therefore, the more real the experience people perceive through their nervous systems, the more indistinct the possibilities of distinguishing between these physical realities and the virtual ones. What's more, under this digital interaction system, users will react by giving emotional responses as if the experience were happening in the real world.

To interpret, as previously said, our brain will rely on features of the logics of the context of virtual worlds and the interactions with their components. However, it will always do so based on the construction of patterns that the brain has established in the dimension of physical reality.

Assuming everything we have been discussing in this interrelation of experiences within the enhanced mirror worlds, there is an aspect to which close attention should be paid, and it relates to pleasure reinforcement actions based on the biological reward system. These actions are now developed within the metaverses, and they could pose significant implications for individuals in their usage and in the promotion of potential digital addictions.

When we talk about life within metaverses, we cannot overlook the topic of behaviors that all individuals assume in their own existence. Motivational psychology understands that for an individual to react to a stimulus with a specific behavior, different motivations (whether conscious or not) will always come into action, making behaviors not arbitrary or spontaneous. Motivation would be part of explaining why a person adopts a certain

> Certain daily experiences within the metaverses will establish various digital stimuli. These will activate different regions of our nervous system, prefrontal cortex or the ventral striatum triggering an attraction equivalent to stimuli in the physical world.

behavior. However, it is not the sole factor, since other important factors also come together to explain why two people, facing the same motivation may act differently or why the same person, when the motivation is repeated, but in different contexts, may also act differently.

An explanation of behaviors has to do with the possibility of avoiding unpleasant situations and, consequently, accomplishing pleasant or rewarding situations, whatever they may be. The metaverse, and in general these new digital territories, will propose people interacting in these digital scenarios with different motivations that may end up with the so-called "consummatory behaviors" [20]. This means that the "motivational cycle" will find its consummation and completion when the person satisfies the purpose. With the satisfaction of what gave rise to the behavior, the sequence closes. On the other hand, the person who does not reach the goal (the motivation that triggered the cycle) will change the goal or try again, as they decide. This means that metaverses will create intentional spaces where the brain will be invited to respond and participate in the active stimuli proposed in its own contextual logic, based and structured by augmented reality, where the possible result could be experiences of positive emotions and hedonistic practices.

One of the advantages of the metaverse in its relationship with the brain -something we know well at this point- is that humans prefer immediate reinforcements given the anticipatory nature of situations and outcomes with which our neural system operates. In this way, the speed of digital stimuli

will be an almost inevitable center of attraction within the interactive processes experienced in these digital environments.

In short, everything expressed so far allows us to anticipate that certain daily experiences within the metaverses will establish various digital stimuli. These will activate different regions of our nervous system, prefrontal cortex or the ventral striatum [21] (Volkow, 2019), triggering an attraction equivalent to stimuli in the physical world. From an educational point of view, it will be of vital importance to teach how to gain awareness and understanding enabling us to respond to these digital neuro-stimuli, and thus avoid falling into traps of shadows which only reflect the intention of manipulation through our cognitive biases [22].

The metaverse in education: crossroads and dangers

As the Italian essayist Alessandro Baricco maintains in his book *The Game* (2018), there is a relationship between the digital world of the metaverse and the real physical world which, in many cases, ends in antagonistic positions. He asserts that there is a tension in dispute between the techno-skeptical view and the techno-optimistic view which rests on the logical antinomy between the physical versus the

> Can we state, without a doubt, that our totally analog world was better than the digital world, or better than the digital/analog hybrid world that is now imposed?

digital worlds. Baricco claims that the "world" -territorial, physical, analog- is today in constant interaction with a new, emerging, digital, immersive, virtual world, to such a point that they become indistinguishable from each other. Both worlds form a unity that clearly results in a fusion, a new conception: as mentioned before, the phygital or digital perspective, meaning the physical and the virtual as a territorial unity where the boundaries become invisible.

These new phygital (physical+digital) territories have clear implications for the brain, which must interpret and manage the various informational formats that reach it through the senses. This means that virtual reality allows an expansion of the real physical "self" through interactions with this emerging technology. Through these interactions, the brain operates through the senses, integrating and interpreting, and above all, attempting to feel, think and perform in response to the challenges presented, always based on its experiences and previous knowledge (de Elorza Feldborg, 2021).

A good pedagogical management of metaverses will enable the exploration of educational contexts in spaces of simulations, communications and social interactions. They will also be articulated in practices representing intellectual and cognitive challenges, with dynamics based on terms of relationships between avatars and physical subjects. In this way, the creation of new learning experiences that will be relevant and engaging to the learning interests of present and future generations will be promoted.

We would like to conclude this chapter where we began it, reflecting alongside Olivetto (2022), who questions what we call reality in his book *Expanded Humanity*. We rephrase his core question in this way: What is real, then, when in the metaverse and for our brains, everything can be real?

In this blend between the physical and the virtual, the "expanded humanity", complemented by all kinds of prosthetic realities, anticipates scenarios of dual coexistence between flesh and silicon, between data and mind, on overlapping and integrated planes. The question about what is real today cannot be the same as that discussed by modern philosophy. The current polymorphous reality is in constant Heraclitean flux. It changes, and its characteristic is change. Technology and consumption seem to dominate this new simulacrum scenario that has blurred the boundary between the real-real and the real-virtual, but living yearning for other contexts and other worlds is useless and inconclusive: Can we state, without a doubt, that our totally analog world was better than the digital world, or better than the digital/analog hybrid world that is now imposed? In any case, it is different and, like any "other", it raises contradictions and resistance.

Meanwhile, the clock of this story does not turn back. The imperative is to move forward with it and harness its positive aspects to our advantage. In our case, all those aspects related to education which contribute to its improvement. Nevertheless, and since in education people interact with people -and this is one aspect that we think will not change- all questions and interrogations we can ask ourselves are valid and

necessary since, without them, we dehumanize ourselves, and the myth of the "soul" of technology is just that: a myth.

Notes

[18] Quantum computing or quantum informatics is a computational paradigm that differs from classical computing, which is based on "bits" (1/0). Its unit is the "qubit", which has the characteristic that it can be in a coherent superposition, meaning it can be 0/1 or 1/0 at the same time or other combinations, opening up the possibility of a greater capacity for representing information.

[19] "Rendering" is the process of generating 2D and 3D images or a scene file through computer programs.

[20] In the simplest terms, and while acknowledging the complexity of the subject, we could say that in response to a stimulus, there can be an "appetitive" behavior, which involves actions of approach or approximation toward the goal set by motivation. Alternatively, there can be a "consummatory" behavior, which involves actions aimed at satisfying that goal (Carranza, 1994, following Craig, 1918).

[21] The "ventral striatum", along with the "dorsal striatum", forms the "striatum", which is crucial in the brain's reward system. Its involvement in learning has been studied, as well as its relationship with dopamine secretion. The striatum is responsible for storing and processing information, functioning as a true memory system. (Rueda Orozco et al, 2006).

[22] A cognitive bias is a distortion in the way people perceive reality. It can be grounded in an opinion or prejudice, based on the interpretation of reality through the available information, whether it is reliable or not, logical or not, and scientifically based or not.

Literature cited

Baricco, A. (2018). *The Game*. Barcelona: Anagrama Baudrillard, J. (1978). *Cultura y simulacro*. Barcelona: Kairos.

Berkeley, G. (2020). Principios Del Conocimiento Humano. Grupo editorial: Editorial Universidad de Guadalajara. Retrieved from: https://editorial.udg.mx/gpd-principios-del-conocimien-to-humano.html

Carranza, J. Ed. (1994). *Etología. Introducción a la ciencia del comportamiento*. Extremadura: Universidad de Extremadura.

de Elorza Feldborg, G. (2021). *Educación, Neurociencia y Nuevas Tecnologías*. La Plata: Servicop.

Leocata, F, (2003). *Persona, lenguaje, realidad,* Buenos Aires: Educa.

Locke, J. (2013). *Ensayo sobre el entendimiento humano*. México: FCE.

Nietzsche, F. (2003). *La genealogía de la moral*. Madrid: Tecnos Nin, A. (1981). *La seducción del Minotauro*. Barcelona: Grijalbo Olivetto, G. (2022). *Humanidad Ampliada, Futuros posibles entre el consumo y la tecnología*. Buenos Aires: Planeta.

Rueda Orozco, P.; Montes Rodríguez, C.; Soria Gómez, E.; Herrera Solís, A.; Guzmán, K.; Ruiz Contreras, A.; Próspero García, O. Dependencia de los sistemas de memoria al ciclo luz-oscuridad en la expresión de estrategias adaptativas. First part. *Salud Mental*, vol. 29, no. 4, July-August, 2006, pp.18-24

Vernaux, R, (1981). *Filosofía del hombre,* Barcelona, Herder.

Volkow, N. D., Michaelides, M., & Baler, R. (2019). The Neuroscience of Drug Reward and Addiction. *Physiological reviews*, 99(4), 2115–2140. https://doi.org/10.1152/phys- rev.00014.2018

Volpi, J. (2011). L*eer la mente. El cerebro y el arte de la ficción*. México: Santillana.

Chapter 5

Metaverses in Education

If we can feel that staying human is worthwhile, even when it can't have any result whatever, you've beaten them.

George Orwell, *1984*

Although it seems that it is clear and that it does not require too much lucidity, it is impossible to answer the question that many ask these days about what will happen tomorrow. There is nothing like an already written future, and yet we are aware that the acceleration, innovation, and transformations that emerging technologies facilitate - including the metaverse- encourage new configurations throughout the social order. Those of us who work in education and seek new forms

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and means of training processes more in line with the demands of the near future, are constantly challenged with new realities, even unthinkable in the most immediate past. Nevertheless, against the tide of changes driven by technology -ever new and in constant flux- and the practices it not only enables but also imposes, staying human, continuing to be human (even though mechanical progress suggests it yields no outcome) is a compass we must not abandon in our journey through these perpetual mazes.

We maintain this humanity as the premise of any approach to education in its relationship with metaverses. To lose sight of it will be to go astray: we are human -we will always be- and we work with humans -they will always be. Advocating for a humanized education, even when immersed in technology, mediated by technology, and geared towards an increasingly technological world, might be a revolutionary proposition amidst so much technological advancement that often sidelines the human aspect or even becomes dehumanizing.

Therefore, the pedagogical anchoring of these new territories presented by the Metaverse requires a comprehensive new model, enabling teachers to navigate the intricate galleries of virtuality without getting lost within them.

In *Education, Neuroscience and New Technologies* (2021) we opened the conversation concerning an applicable model for teaching which we referred to as "Neuro-Techno-Pedagogical Model", in reference to the three basics on which any current teaching and learning proposals should pivot: the contributions

of neuroscience to education, the so-called “New technologies”, and pedagogies and their strategies, permeated and updated by the first two areas. A year after that contribution we aim to update a model that remains current and applicable even with the new immersive territories that metaverses unfold for us.

We hope that the model we present hereafter will clearly demonstrate how to operate pedagogically within the possibilities offered by these synthetic worlds; for this, we have focused on the idea that an educational proposal aligned with the brain's way of learning should be aimed at strategies that will not overlook active learning and experience-centered learning.

One of the strong points of metaverses is enabling students not only to learn, but to live learning experiences. Therefore, it is vital to understand that the dynamics and didactic strategies that we use within these virtual worlds must be connected with interactive connectivist perspectives between people and the objects that constitute virtuality. However, it is necessary to point out that our proposal is not that of a connectivism that disregards co-construction, as if knowledge could exist independently of people and inhabit depersonalized networks. On the contrary, to make them successful, building these networks of connections as well as traversing them continues to be a human skill [23].

This construction must be based on a design stemming from pedagogical scaffolding and on specific forms of distributed cognition [24], central ideas when aiming to educate in immersive virtual territories. Basically, distributed cognition

interprets the cognitive process without a centralizing element that unifies and processes all the information, although it includes not only individuals but also the tools and representations with which these people operate and interact with (Giere, 2002). Hutchins (1996) had already compared the cognitive process to driving an airplane, where it is not enough to have one person to centralize all the information and all the actions, but rather it depends on many individuals, who simultaneously develop thoughts and actions, interacting with the appropriate tools. Hutchins (2000) states that the cognitive process depends on the functional relationships between elements. In this way, cognition occurs in a network of interpersonal relationships and of those people with the artifacts and the symbolic and sociocultural representations involved.

> We stated that the change is much more than just adding technologies to the traditional curricula and pedagogical methodologies already in use. It is not about simply replacing old technologies with new ones that markets offer. Educational territories have changed so drastically in these years of the 21st century that it is no longer possible to adapt solely with minor modifications.

On the other hand, and within the paradigm of learning as a display of distributed cognition, the "pedagogical scaffolding" developed by Bruner (1984) based on the studies of Vygotsky (1978) understand that the teacher provides a series

of structures, of "scaffolding" supports so that the student can advance (and sustain himself) between what he can do on his own and what he can do with the help of that scaffolding. Pedagogical scaffolding, then, understands learning as an "assisted effort," meaning an intervention in the "zone of proximal development" (the student's competencies) to help them progress towards their developmental potential. Scaffolding, therefore, acts as a facilitator for self-regulated learning.

As we already mentioned in *Education, Neuroscience and New Technologies* (2021), a paradigm shift in education is imperative, and our contribution aims to be part of that change. We emphasized the need for immersion in the innovations that technology offers through its multiple mediating potentials. We stated that the change is much more than just adding technologies to the traditional curricula and pedagogical methodologies already in use. It is not about simply replacing old technologies with new ones that markets offer. Educational territories have changed so drastically in these years of the 21st century that it is no longer possible to adapt solely with minor modifications. This radical change makes a revolution essential, one that will also transform teaching, learning and evaluation processes radically. In a world -and in education in that world- characterized by change, unpredictability, acceleration and paradoxical processes, the revolution involves transforming pedagogy, the methodology, contents and also the tools chosen to perform these changes. In this new metaverse territory, the digital expands to connectivist resources and policies through new techno-human interfaces. Within them, neuro-technological processes are becoming our reality. Therefore, if

we look into the future, we will realize that it is not simply the place where we are heading but something that we are discovering and building.

We once again advocate for the concept of "school" as the space for the production and understanding of learning, admitting that there is something in the teacher-student interaction that machines have not yet been able to replace. Instead, we consider transforming the walls of classrooms to access immersion in the world of metaverses, aligning with the ongoing shifting of the boundaries of knowledge that we are witnessing.

In this pedagogical model of innovation, the proposal is to build spaces in which understanding is the primary objective of the educational act. To this end, the scaffolding will be aimed at promoting participation, collaborative learning, interaction and interactivity, under immersive socio-pedagogical guidelines that will privilege not only peer learning but also the discovery of knowledge.

In this context, it is not only important to consider knowledge in terms of quality and quantity but also how the student interacts with it, how they think about it, organize it, and relate it to their world. That is why understanding the cognitive structure and synaptic connection networks

> In a world -and in education in that world- characterized by change, unpredictability, acceleration and paradoxical processes, the revolution involves transforming pedagogy, the methodology, contents and also the tools chosen to perform these changes.

of the learner become an essential factor when organizing a meaningful pedagogical framework. For learning to be valuable, its goal should be to establish relevant relationships between knowledge and the student, between knowledge and the world, and between new and prior knowledge. The relational factor is the most important issue, even more so than the knowledge itself: if the student cannot relate -if, as educators, we fail in achieving this connection- learning will be limited to accumulating content in an "unnecessary file folder" destined for the recycling bin.

The proposed model, therefore, enables an education based on understanding, which will develop in relation to the metaverse and the contextual logics [25] that each student proposes. That is why we say that teaching should focus on fostering thinking -and above all, the ability to do things- through learning experiences, rather than just imparting content. The teacher responsible for this type of education will be trained to act based on feedback from the student who, being encouraged to think, will also be inclined to doubt, dissent, express opinions, question, and even contradict. In today's education, which is currently part of a network of connections where knowledge circulates freely, sometimes even without the need for teachers, there is no longer room for the central and authoritarian role that educators once held. This paradigm shift in roles will also require adaptation to pedagogically integrate into current teaching and learning processes.

Learning within immersive digital spaces will be achieved through experiential learning [26], meaning teaching to

think by thinking: whether it's in the realm of hard sciences or in the domain of humanities and social sciences.

The Techno-Pedagogical model already presented is perfectly applicable to metaverses because it encourages the disruptive and innovative inclusion of emerging technologies [27] in outdated educational models that are no longer functional for the needs of this century. Additionally, we can continue to refer to it as the "Neuro-Techno-Pedagogical Model" since neuroeducation has much to contribute to education in general, especially within immersive virtual environments such as the metaverse.

Indeed, in this Neuro-Techno-Pedagogical-Cognitive-Digital-Social model, the contribution of neuroscience and the array of tools offered by emerging technologies play a fundamental role in these new immersive digital territories of the globalized world we inhabit: the "place" of learning extends beyond the traditional classroom walls, and educational activities involve both teachers and students as part of a social fabric that is evolving and demanding transformation. This transformation is necessary for education to continually adapt to the needs of the present time.

In this context, teaching actions should be aimed towards placing the student at the center of immersive experiential formative activities to achieve understanding of learning, leveraging the new possibilities that the metaverse offers in education, even allowing for the customization of content, methodologies, and tools, improving the possibilities of monitoring learning and its follow-up evaluation.

The student, as the focal point of all educational activities, will develop competencies and skills based on Knowing-Knowing, Knowing-Thinking, Knowing-Doing, and Knowing-Being. In other words, learning to know, learning to think, learning to do, and even learning to be, in a continuous learning framework.

As we've been emphasizing, the teaching role also undergoes transformation, turning educators into builders of learning environments, facilitators, and enhancers of processes that teach to think to achieve understanding. They are also didactic-digital-generational mediators capable of operating with pedagogical meaning in the new immersive educational territories. In this operation, they will pay attention to the contextual logics that metaverses present in the integration and interoperability of each of their virtual worlds, considering their availabilities and advantages with educational significance. The simple transmission of content, highly valued in a traditional conception of the teaching role, gives way to communication and the promotion of discovery, participation, interaction, interactivity, collaboration, and connectivism, and, of course, the evaluative task in its broad sense, not only as a simple accreditation of achieved knowledge.

> We consider transforming the walls of classrooms to access immersion in the world of metaverses, aligning with the ongoing shifting of the boundaries of knowledge that we are witnessing.

Content also undergoes a repositioning of its centrality and begins to be understood as a scaffolding network to facilitate the understanding of knowledge, not only in the physical dimension but also in the digital and now in the integration of both "phygital" spaces. It is worth clarifying that contents in metaverses can be presented and worked on in a way that they are pedagogically intervened, having countless resources available on the network for these purposes. This "intervention" aims at linking the student with these contents, as well as the teacher-student, student-teacher, and student-student interactions, motivating collaborative learning thus awakening the possibility for students to relate new knowledge to what they already know, to what their peers know, to what freely circulates on the web, and to the world they are part of.

The pedagogical model, therefore, focuses on the innovation of pedagogical narratives, active learning, and in the potential that the use of technological mediations offers in the immersive territory to achieve disruptive teaching and learning processes. This disruption relies on a strategy more centered on the "question mode" than on the "answer mode" and on the development of increasing complexity.

Likewise, when deciding on the implementation of Emerging Technologies for educational purposes, they must adhere to the pedagogical constraints of their use. In other words, these new technologies that constitute the metaverse should be applied with a sense of opportunity, relevance, and significance.

Opportunity: Is it the optimal moment to implement immersion in the metaverse, as proposed in the objectives and in line with the educational intent being pursued?

Pertinence: Is the selected virtual world the most conducive to enhancing teaching, learning, and evaluation processes according to its contextual logics?

> The relational factor is the most important issue, even more so than the knowledge itself: if the student cannot relate -if, as educators, we fail in achieving this connection- learning will be limited to accumulating content in an "unnecessary file folder" destined for the recycling bin.

Relevance: Do the obtained results reflect the achievement of the presented objectives, along with clear evidence of students' understanding after the immersive experience?

The creation of communicative spaces, of dialogue, is a priority in this model, not only in the physical dimension but also in the digital and phygital realms. Just as knowledge and information circulate, so does language, and in this circulation lies the concept of collaborative and participatory learning. In metaverses, the scenarios of virtual worlds are immersive, and these scenarios should be open to fostering communication and generating different pedagogical interactions and various activities.

Let's remember that activities within the framework of immersive pedagogical acts should also challenge students' cognitive limits through research, understanding, communication, collaboration, interaction, and interactivity, always within immersive scenarios.

Online Educational Interventions are processes that make up the educational act in the immersive virtuality scenario. These processes are configured as techno-pedagogical and techno-evaluative devices operating under the contextual logics of the metaverse. Note that we refer to them as techno-evaluative devices because, even in metaversal immersive scenarios, assessment integrates teaching and learning processes, and no virtuous pedagogical circle can do without the evaluative instance: as a meta-evaluation of the teaching process and as an evaluation of the learning process.

As we mentioned in our previous book, and now we elaborate further, there are certain premises that teachers must consider whenever they face a pedagogical challenge in metaverses.

- The teacher will no longer be a provider of information.
- Nor will they be a mechanical or repetitive reproducer of actions for task and activity resolution.
- Instead, they should be able to propose an educational approach based on strategies of discovery, gamification, surprise, and challenge within immersive worlds, leveraging their contextual logics.

- They must also be able to adapt their teaching methods to a pedagogy of questioning, encouraging discovery and learning much more than pedagogies of responses that hinder thinking.

- Additionally, they should develop skills to identify and foster different types of thinking according to the various instances within the metaverse.

- They will need to challenge cognitive indicators through their educational practice.

- Fundamentally, they should be able to create immersive scenarios that promote teaching to think and learning by doing.

Educational keys to implementing Neuro-Techno-Pedagogical-Immersive Model and Devices

- Our brain is designed to detect patterns and make interpretations whether in the physical or virtual immersive worlds.

- Talking about "thinking" makes little sense without considering the purpose and contextual logics operating in the educational proposal.

- Contents for immersive learning should be related to comprehension rather than memorization.

- Thinking and attention are awakened and stimulated by content that seduces, challenges, provokes, surprises, and rewards.

- Understanding is even more important than students completing their tasks. The teacher should focus their efforts on the former if they want the latter to happen.

- Retaining information through the repetition of routines is training, not learning.

- Indicators of cognitive processes oriented towards understanding involve: knowing, applying, analyzing, synthesizing, evaluating, creating, remembering, comparing, valuing, deciding, differentiating, recognizing, discovering, interpreting, criticizing, distinguishing, classifying, selecting, arguing, explaining, participating, collaborating, constructing.

- The model we present works best when our Online Educational Interventions are mediated by cognitive triggers in the form of questions that interrupt the learning process to promote thinking and understanding. These questions include: What?, Why?, For what?, Which?, Where?, How much?, How?, With what?, In what way?, Who?, To what extent?, and other of a similar nature.

Through the application of this model, it is expected that the student will be able to:

- Observe, and then articulate what they have observed.
- Interpret contents considered and also be able of explaining them.
- Differentiate between the essential and the accessory.
- Reason about contents.
- Infer based on evidence.
- Connect diverse elements.
- Include different points of view in their reasonings.
- Question and self-question.
- Distinguish between arguments and prejudices.
- Organize thought with arguments.
- Formulate conclusions.

The objectives, then, pursued by applying this model are related to students' ability to operate cognitive indicators, to apply various types of thinking, develop competencies, be able

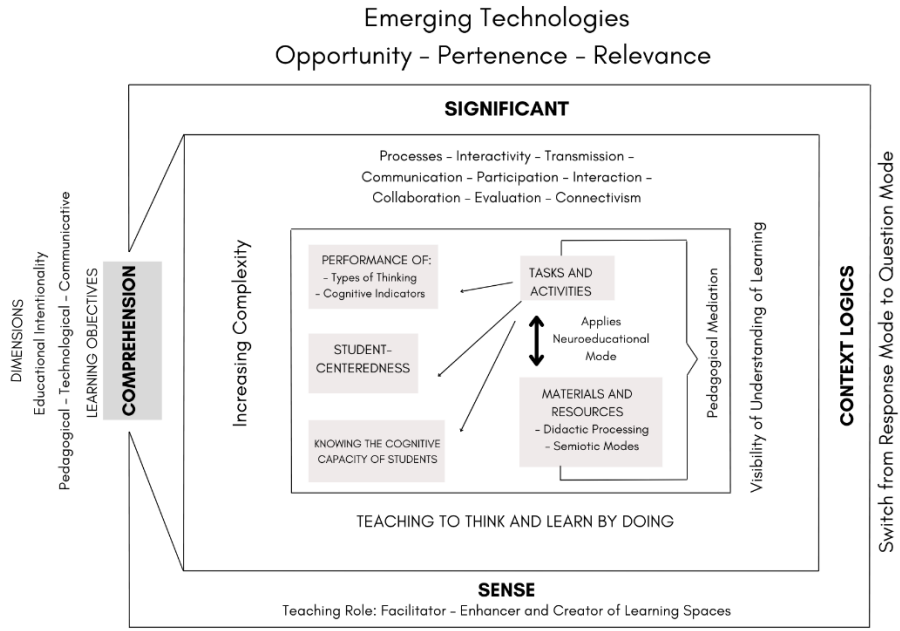
to solve problems, make decisions, and form judgments based on knowledge.

In this model, ultimately, the goal is to engage between cognitive neuroscience, neuroeducation, education, and emerging technologies in a dialogue to propose potential pathways for how the learning brain operates within the new spaces offered by metaverses and amid new educational demands.

> The pedagogical model, therefore, focuses on the innovation of pedagogical narratives, active learning, and in the potential that the use of technological mediations offers in the immersive territory to achieve disruptive teaching and learning processes.

Like any proposal, and in line with the premises we present and consider fundamental to education, ours is open to conversation and discussion. It is not definitive, as no knowledge ever is, especially when we attempt to relate areas of knowledge that are in constant change: neuroeducation and new technologies.

Just as we emphasize that an education that does not change, progress, or adapt must inevitably accept its death certificate, we also suggest that the model we introduce is an open model and necessarily a model promoting changes and adaptations: so vertiginous as our world transformation is, as virtual territories are, and as education seeking to respond to them is.



Architecture of a Neuro-Techno Pedagogical immersive teaching device for the development of Online Educational Interventions proposed by Dr. Gustavo de Elorza Feldborg (2023).

Notes

(23) Downes (2007) explains that the concept of "connectivism" refers to the idea that knowledge is distributed through a network of connections that naturally forms through association. In other words, knowledge is not "constructed", "transferred", or "created" through intentional actions. This epistemological stance, somewhat opposed to constructivism, has faced multiple objections, among which the disregard for the human factor in the process can be highlighted.

(24) It is also known as "Embodied Cognition" (embedded, incarnate, inactive, extended), based on paradigms that go beyond Cartesian dualism of "mind-body" (a dualism that can be traced back to Plato, the Greeks in general, and Gnosticism in particular). The conviction here is that there is no possibility of cognition without bodily mediation, considering its limits and demarcations. Cognition, therefore, arises in a system of "mind-body-environment".

(25) We refer to "context logics" as the elements surrounding the educational act and the processes of teaching and learning (the environment, prior knowledge, cultural influences, tastes and preferences, etc.), which undoubtedly influence and interact with the educational act itself.

(26) The "experiential learning" concept was introduced by Kolb (1984), who explained it as a cycle that begins with the concrete experiences to which the learning subject is exposed. In the second stage, reflection on the experiences occurs, through which the learner starts to generate theories about the experience. A third stage involves abstract thinking generated from these theorizations, and finally, a return to experience with enriched knowledge, enabling the application of that knowledge to new experiences.

(27) "Emerging technologies" are those that are constantly appearing, novel, and even those that already exist but are updated and adapted every day. Examples include artificial intelligence, virtual reality, augmented reality, and the metaverse, among others. Incorporating these technologies into the classroom is essential to create relevant, innovative learning experiences that engage and motivate learners.

Literature cited

Bruner, J. (1984). *Acción, pensamiento y lenguaje*. Madrid: Alianza Editorial.

de Elorza Feldborg, G. (2021). *Educación, Neurociencia y Nuevas Tecnologías - ¿Cómo aprende el cerebro en la Sociedad del Conocimiento?* La Plata: Servicop.

Downes, S. (2007). An Introduction to Connective Knowledge. Hug, Theo (ed.) In: *Knowledge & Education-Exploring new Spaces, Relations and Dynamics in Digital Media* Ecologies. Innsbruck University Press.

Giere, Ronald N. (2002). Distributed Cognition in Epistemic Cultures. *Philosophy of Science*, 69, 637-644.

Giere, Ronald N. (2002). Scientific Cognition as Distributed Cognition. In Peter Carruthers, Stephen Stitch y Michael Siegal (eds.), *The Cognitive Basis of Science* (pp. 285-299). Cambridge: Cambridge University Press.

Giere, Ronald N. (2007). Distributed Cognition without Distributed Knowing. *Social Epistemology*, 21(3), 313-320.

Hollan, J., Hutchins, E., & Kirsh D. (2000). Distributed cognition: toward a new foundation for human-computer interaction research. *ACM Transactions on Computer-Human Interaction,* 7(2), 174-196.

Hutchins, E, Klausen, T. (1996). Distributed cognition in an airline cockpit. In Y. Engeström and D. Middleton (eds.). *Cognition and communication at work*. New York: Cambridge University Press.

Kolb, D.A. (1984). *Experiential learning: Experience as the source of learning and development.* New Jersey: Englewood Cliffs.

Ricthhart, R., Church, M. & Morrison, K. (2014). *Hacer visible el pensamiento - Cómo promover el compromiso, la comprensión y la autonomía de los estudiantes.* Paidós.

Vigotsky, L. (1978). *El desarrollo de los procesos psicológicos superiores*. Madrid: Grijalbo.

Chapter 6

Example of a general activity based on a Neuro-Techno-Pedagogical – Immersive Device

1. Cover

Hamlet un the 21st century [28]
(Clearly visible title)

(Illustrative image. Very important for capturing attention)

Teacher in charge of the Metaverse Immersion: XXX

Duration of the activity (from – time – until)

Link: www.xxxxx.xxx

Tips:
➢ Allow the link to access the metaverse, where the proposed activity is located, to be clearly visible. ➢ The cover is the gateway. Remember this to capture the interest, curiosity, and emotions of the student from the very beginning. ➢ Play with the layout and font type to emphasize what you want to highlight. ➢ Add design. ➢ Organize. ➢ Prioritize. ➢ Review writing and spelling.

2. Development of the activity [29]

2.1 Perform a brief introductory description:

We will work on an article from Clarin newspaper dated November 20, 2017, titled *Datos y Deseos: Hamlet en el siglo XXI* [*Data and Desires: Hamlet in the 21st Century*], by Raúl Martínez Fazzalari and Sergio Zabalza.

2.2 Add the material you will work on and suggest the reading:

Tips:
➢ You can present it in this way or in some other creative manner, so that it is clear that this is the material we will be working on and what steps will be taken. ➢ Explicitly state the source of the material.

We read together:

Students should go to the link corresponding to the article Data and Desires: Hamlet in the 21st Century, by Raúl Martínez Fazzalari and Sergio Zabalza, from Clarín newspaper:

https://www.clarin.com/opinion/datos-deseos-hamlet-siglo-xxi_0_S16rc7RJz.amp.html

2.3 Explain the "Educational Intention"

Tip:
We must be clear about what we intend the students to achieve, that is, what is defined as "educational intentionality". Likewise, it is important to make it known to the students, as this knowledge of the objectives promotes the process of understanding.

Educational intentionality (you can choose one or several, depending on your objective):

- Knowing - Knowing
- Knowing – Doing
- Knowing - Being
- Knowing - Integral

2.4 Detail the proposed activities

a) We reflect on the title: "Hamlet in the 21st Century"

Tip:

We can start with a question that uses a cognitive trigger, in this case, "What", for example:

To know more: What do we talk about when we talk about Hamlet?

The students can conduct an internet search by entering "Hamlet" into the search engine. The first result will likely be Wikipedia, where they can read:

Hamlet is Shakespeare's longest play and one of the most influential works in English literature (...) The play is set in Denmark and revolves around the events following the murder of King Hamlet (father of Prince Hamlet) by his brother Claudius. The ghost of the king urges his son to avenge his murderer.

The play vividly revolves around madness (both real and feigned) and the transformation of deep grief into overwhelming anger, in addition to exploring themes such as betrayal, revenge, incest, and moral corruption.

In this initial quick search, students will learn what "Hamlet" is (a play by the English playwright William Shakespeare), where the setting of the play is (Denmark), who Hamlet is (a prince whose father, King Hamlet, is murdered by his brother Claudius), and which the themes of the play are (revenge, grief, anger, betrayal, incest, moral corruption).

b) Analysis of content

Tip:

The text, video, or material that we use as content should be pedagogically intervened in segments. This means we can insert questions, comic strips, images, and graphics, among other possible interventions, so that the student pauses and takes the time to think, reflect, and comprehend what they are reading. They may even engage in metacognitive exercises. Following, we provide an example of intervention through questions (note that the interventions are paragraph by paragraph or section by section).

Data and Desires: Hamlet in the 21st Century

by Raúl Martínez Fazzalar

It is well known that hyper-connectivity obstructs, with interruptions of all kinds, the possibility of focusing attention on a single and exclusive objective. Whether it be

WhatsApp, messages, Messenger, emails, the phone, or the multiple combination of all of them, it often prevails over any attempt to achieve a calm and fertile solitude.

How could you explain the term “hyper-connectivity” and its relationship with this paragraph?

It's as if a multitude of data and alternatives overwhelmed the capacity for discernment and processing in individuals. It doesn't take much insight to agree that the issue lies in discarding or suspending this range of stimuli so that concentration on a text, an exercise, or a task becomes possible— in other words, it's about making a choice. Here lies the inhibition that distinguishes the current subjectivity (evident in the compulsive consumption of substances to achieve the opposite effect): a Hamlet of the 21st century whose vacillating litany also oscillates between To Be or Not To Be.

From this perspective, it becomes interesting to infer that the matrix of the current world of communication also rests on other binary alternatives, namely: ones and zeros within a byte. Whether to regulate or not the contents of the Internet, whether to control or not communications.

Can you think of other types of binary thoughts and provide examples?

Now, the space in which a person takes ownership of their actions to break free from inhibition is not in zero or one but in the position the subject takes regarding this deceptive alternative. That is: if Hamlet had known that the murderer of his father had merely fulfilled his own unconscious desire (that of Hamlet), there probably would

not have been so much room for scruples.

Who is the murderer of Hamlet's father, and how does he carry out the crime?

However, Hamlet is inhibited by information—a piece of data—that reaches him with the tone of a command, and its urgent demand allows for no processing. From his physical (not virtual) actions arise legal consequences that shape the story: a homicide, revenge, guilt, redemption.

Indeed, a perfect drama. Something similar occurs with the thrust of the present era: while cyberspace, advertising, and the screen ceaselessly capture the attention of the user or viewer, the messages from the environment, whether virtual or real, impose a biased obligation to choose based on binary options, namely: you are or you are not creative, successful, unlimited, belonging, accomplished, young, wise, or a winner.

What relationship could you establish between Cyberspace–Screens, and Advertising in the 21st Century?

What this dichotomous presentation focused on Being hides is the message it imposes: stick with Everything. States and companies participate directly or surreptitiously in offering this duality, almost endlessly expanding the subject's possibilities for choice

If I am not on electronic networks, will I be? The more data I generate and consume, the more I am determined or conditioned by them—records, affirmations, photos, or videos seem like an endless race of empty information. We

could modify Shakespeare's famous soliloquy today: To connect or not to connect, that is the question."

Based on the following phrase, can you provide us with a conclusion about what you think?
"If I am not on Social Media
Will I be or not be?"

c) Digital resources to learn more

Tip:

Utilize intertextuality and hypertextuality. Intertextuality is the relationship that can be established between different texts, even between different textual plots (such as paintings with literary works, written texts with audiovisual texts, comics with musical themes, and so on—relationships can be inexhaustible). Meanwhile, hypertextuality is related to the network or networks with which a specific text can connect (when we talk about 'text,' we don't only refer to a written text but also to a 'web' or 'plot'). Example:

We invite you to watch the following video to learn about the plot of "Hamlet".

https://www.youtube.com/watch?v=bb69mI3of_U

3. Learning and understanding objectives

Tip:
As mentioned before, regarding the 'Educational Intent,' specifying the objectives serves not only the planning of the activity (only those who know where they want to go will know how to get there) but also the learning process. In this way, the student will know what is expected of them and will be able to give context to the proposed activity and the provided material. For example:"

3.1 Pedagogical Objective (What do I want the students to know, learn and understand? –Key element).

It is expected that students analyze and discover how the elements of William Shakespeare's "Hamlet", along with its main questioning, can be applied as a form of interpretation of some aspects of 21st-century society.

Tip:
Note that for the formulation of this objective, the following indicators of cognitive processes are used: "Analyze","Discover" e "Interpret".

3.2. Technological Objective. With what digital tool and in what way am I going to develop the processes of teaching, learning, and assessing?

It is expected that students select and create a digital presentation in the format of a mind map, in which they can observe and describe what is presented in the article provided by the teacher and formulate conclusions that should be within the mind map created by the student.

Tip:
Note that in this objective, we have combined cognitive indicators with activities of the mind, that is: observing and describing what is observed, and formulating conclusions.

3.3. Communicative Objective.

What type of communication do I aim to achieve? (asynchronous/synchronous/immersive), What format will the communication have? (debate / queries / negotiation of meanings / presentation of content, etc.).

It is expected that students engage in communicative processes through the dialogue space (Forum) called 'And you, Hamlet, what can you tell us?' In this communicative channel, the aim is for students to take on the role of Hamlet and speak on his behalf, expressing in writing thoughts related to Hamlet in the 21st century.

Tip:

Note that the students' responses should be placed in a dialogue space, based on a virtual campus or learning platform, working in a combined manner through TRIUNE territories (face-to-face, virtual-platform/campus, and immersive metaverse) as mentioned earlier.

First learning and understanding action (Immersion in the Metaverse)

Central question: What is the story behind the name of Hamlet, and what wordplay does Shakespeare engage in with this name, and for what purpose?

Tips:

- The teacher must in advance, select and prepare an immersive virtual space in the metaverse, and based on their strategy, deploy various informational objects that students will work with. For example: uploading videos, images, questions, QR codes based on augmented reality, and external links to the metaverse to guide the proposed journey for students in that virtual space. Likewise, the teacher will propose the working method for this first learning action, i.e., individual, group or in pairs.

- For this immersive activity, the following processes will be taken into account: Interactivity / Communication / Participation / Interaction / Collaboration and Evaluation.

Second learning and understanding action

Activities:

A. Reflect on the following phrase and explain the relationship of individuals with the use of Social Media (SM) in the 21st century. Place your personal appreciation on your mind map:

"In our mad attempts, we give up what we are for what we hope to be".

B. Solving the following activity involves working with all the materials provided for its development. Therefore, you must construct a mind map in which the following types of mental activities can be clearly visualized, and the main concepts and their relationships can be understood. We also present some questions that will serve as a central element to organize possible answers applied in the design of the mind map.

Central questions:

a) What is the writer's intention in naming his article "Data and Desires: Hamlet in the 21st Century"?

b) What is the relationship between the following statements: "To be or not to be, that is the question" and "To be connected or disconnected, that is the question"?

c) What aspects do you consider central regarding the Information and Knowledge Society?

In the construction of the mind map you should integrate:

a) The following cognitive indicators:

Discover, Interpret, Criticize and Distinguish

b) The following mental activities:

- Explain and interpret.
- Establish connections between diverse elements, ideas, and concepts.
- Distinguish between arguments and prejudices.

Form and criteria for the evaluation and assessment of the process and the final product delivered

- Scope of pedagogical, technological, and communicative objectives.
- Application of cognitive indicators in the Mind Map.
- Application of types of thinking in the Mind Map.
- Construction of the Mind Map.

- Participation in the dialogue space (forum) with contribution to the posed question.
- Explanation, debate of the Mind Maps, and participation within the metaverse.

Notes

[28] The material used in this proposal for an educational activity will be used exclusively for pedagogical purposes. It was obtained from the following website:

https://www.clarin.com/opinion/datos-deseos-hamlet-siglo-xxi_0_S16r-c7RJz.html

This article was taken from *Clarin,* one of the most widely circulated newspapers in the Argentine Republic. The theme it explores is the parallel between Hamlet's central question *To be or not to be*, in relation to the generations in the 21st century considering their integration in society and everyday life if they are virtually connected or not.

[29] When designing the activity, you won't need to include these titles.

Chapter 7

Conclusions

The danger is that if we invest too much in developing AI
and too little in developing human consciousness,
the highly sophisticated artificial intelligence of computers
will only serve to strengthen the natural stupidity of humans.

If we're not careful, we'll end up with degraded humans
misusing enhanced computers,
causing chaos within themselves and in the world.

Yuval Noah Harari

There is an inexorable advance in the development of emerging technologies that undoubtedly won't halt in the future. It is not an advance to be feared, much less fought against. It is meant to be embraced and enjoyed, as the benefits it brings and will bring are countless across all areas. Those of us working in education cannot turn our backs on this reality, risking irrelevance if we do. Thinking about education for the present and future means contemplating immersive territories, artificial intelligence, and metaverses since education correlates with the world it aims to prepare for and where it seeks to place students.

However, accompanying and navigating with preparation and competence through the labyrinths presented by education and within the territories of the metaverse does not mean doing so without critical thinking, without a sharp gaze, without ideological suspicion, ultimately, without awareness. The Israeli thinker, Yuval Noah Harari, raises a fundamental question in *"21 Lessons for the 21st Century"*, one that we have also attempted to reflect on throughout these pages: Harari's thesis implies that focusing attention, resources, and effort solely on technology's development and the flourishing of algorithms, neglecting consciousness, will eventually lead to failure or, worse, catastrophe. It will birth a monstrously hypertrophied entity in its mechanical aspects but unable to master and channel the broad array of possibilities that technologies can offer. Because technology without humanity, we say, is Hiroshima.

> The pragmatism and immediacy dominating education -and the world at large- enforce profit-oriented logics, asserting that the only valuable education is that which aims for merit, success, economic returns, and efficiency. Within this paradigm, the capitalist fetish, education aims to create Frankensteins of immense operational power but limited consciousness to guide that power. The technology might be perfect, but its product will be dehumanization.

Harari's point is the misperception between "intelligence" and "consciousness." For now, the science fiction predictions about technologies with consciousness remain in the realm of fiction. We are not saying it cannot be real in the

future; we are just stating it is not real in the present or the immediate future. That is why, according to the author, the human element "consciousness" has not been able to be "manufactured" in the laboratory. We still believe that consciousness does not come pre-packaged from Silicon Valley. And this is not a detail that can be overlooked, even when we talk about education mediated by technology, about adapting education for the 21st century, and about education in immersive territories. Losing sight of this is also getting lost in the labyrinths of the metaverse.

We are currently experiencing a crisis in the humanities. It would be better to say: we are currently experiencing a crisis in the teaching of the humanities. The pragmatism and immediacy dominating education -and the world at large- enforce profit-oriented logics, asserting that the only valuable education is that which aims for merit, success, economic returns, and efficiency. Within this paradigm, the capitalist fetish, education aims to create Frankensteins of immense operational power but limited consciousness to guide that power. The technology might be perfect, but its product will be dehumanization.

American thinker Martha Nussbaum refers to this crisis as the "silent crisis," upon which, in her words, even the future of democracy depends: the abandonment of teaching arts and humanities in favor of other subjects considered "more practical" results in students losing the opportunity to develop critical thinking, the ability to think, relate, make abstractions, judge. *"If this trend continues, nations worldwide will soon produce entire generations of utilitarian machines instead of*

complete citizens capable of independent thought, possessing a critical view of traditions, and understanding the importance of others' achievements and sufferings." (Nussbaum, 2011).

In line with this thesis, Palestinian thinker Edward Said (2004) also voices a similar sentiment: *"Education entails broadening the circles of awareness, each contributing a different plane of analysis while maintaining contact with others due to worldly reality."*

It is important to revisit Edgar Morin and his complex thinking, especially his understanding of the need for a restoration of the complex unity of human nature that disciplinary knowledge has fragmented. For this author, there are seven keys to education for the future: teaching the human condition, teaching earthly identity, facing uncertainties, teaching understanding, and the ethics of the human race. One of Morin's educational pillars is to address rationality but also irrationality, technique, and knowledge that favors the economic, but also art. Ultimately, it is about recovering the human: restoring balance. In his words:

> *The 21st century must abandon the unilateral vision that defines human beings solely by rationality (homo sapiens), technicality (homo faber), utilitarian activities (homo economicus), and obligatory needs (homo prosaicus). The human being is complex, carrying within them, in a bipolar manner, antagonistic characteristics: sapiens and demens (rational and delirious), faber and ludens (worker and playful), empiricus and imaginarius (empirical and*

> *imaginative), economicus and consumans (economic and wasteful), prosaicus and poeticus (prosaic and poetic). Thus, the human being does not solely exist through rationality and technique: they expend themselves, engage in dances, trances, myths, magics, rites; they believe in the virtues of sacrifice, often living to prepare for their afterlife beyond death. Everywhere, technical, practical, and intellectual activity testifies to empirical-rational intelligence; equally everywhere, celebrations, ceremonies, cults with their possessions, exaltations, excesses, "consummations," testify to the homo ludens, poeticus, consumans, imaginarius, demens*. (Morin, 1999).

Education will always be a person-to-person relationship, an I-You dialectic, regardless of the technological mediation we use. As we've mentioned in previous books: technologies have always accompanied teaching. It is just that now, at this stage of technological advance, we struggle to strictly perceive the blackboard and chalk as "technologies". However, technologies are merely tools or means -whatever they might be- employed in a certain sector, in this case, in education. Pedagogies and didactics mediated by technology are as old as the first formal teaching attempts. The important aspect, and what we have tried to articulate in these pages, is not to turn away from change, development, and progress that these technologies are undergoing. Because educational technologies always trail behind the technologies that already prevail in the world and govern their logic. Therefore, rejecting them would mean rejecting the world and plunging into a

mismatch that would inevitably condemn educational attempts to irrelevance.

In the development of the metaverse and its primary agent of the future, artificial intelligence, we must learn to coexist with algorithms and understand their language -as humans first and as educators afterward- if we do not want to lose control over our decisions. Because, following Harari, the danger in the near future does not lie in robots replacing humans, but in the creation of an elite of superhumans empowered by algorithms, subjugating ordinary humans without that power. Unfortunately, inequality in access, the Gini coefficient applied to education, imposes that this danger is not just a future prospect but a present reality.

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Éric Sadin, a French philosopher and author of works like "*La humanidad aumentada"* (2017) [*Augmented Humanity*] and *"La siliconización del mundo*" (2018) [*The Siliconization of the World*], holds a highly critical stance regarding the empire of technology and the aspiration to separate it from the human. According to Sadin, Artificial Intelligence is an empowered computer program. Yet, it places us at the threshold of a human intelligence assisted by the artificial, inevitably leading us towards a new type of dehumanized humanity, governed by algorithms -a concept he calls "antrobology" and describes as a

"civilizational scandal". This new hybrid subjectivity, precisely the "augmented humanity," inaugurates an algorithmic dominion of human praxis, of which it is essential not to lose sight, as we risk falling into the dystopia of dehumanization. His almost pessimistic view warns about the "death of man" (*sic*), surrendering human prerogatives in favor of a superior intelligence that can perform better, despite lacking consciousness, as we have been asserting, and this lack of consciousness implies that the "reasoning" of that intelligence has evident deficiencies compared to human intelligence. As Antonio Damasio (2021) explains, there is a preliminary step before understanding (thinking), and that is precisely "feeling," and as of now, there is no technology that has achieved this.

It is necessary to consider that artificial intelligence and human intelligence are not supplementary entities but complementary. Therefore, the use of technologies and metaverses, with all their emerging futures, should be a strategic ally for society -especially for education- enabling us to enhance our human condition.

We should not be seen as joining the voices, as Alessandro Baricco (2011) puts it that resist or fear change, comparable to someone looking at the horizon, anticipating barbarian invasions or the apocalypse itself. Neither dystopia (everything is wrong and will worsen) nor utopia (everything is perfect and will always improve): we promote leveraging the tools brought by progress—those already in place—but with a critical spirit, always prioritizing the human over the technological. Let's call this critical stance "*isorropia*" (Gr. Ισορροπία, balance), understanding it as a middle ground

between total and blind trust and absolute distrust that blocks the future. It is true, as Baricco (2019) also suggests, that the "digital insurrection" democratized access to technology, somewhat breaking the privileges of a few by placing smartphones or other devices in everyone's hand. According to the Italian thinker, this insurrection was a rebellion against the cruelest century, in his words, witnessed by humanity: the 20th century. However, can we be certain that this insurrection, which transferred technology from the hands of a few to the masses, won't bring about new missteps? We cannot be sure. Hence, it is essential to ride the wave without leaving our reasoning and critical thinking behind, abandoned on the shore.

The conviction, also following Baricco (2019), is that the borders between the "real" and the "virtual" are "secondary" borders since what we call "reality" is composed, as a continuum, with both sides of the same coin (the "world" and the "ultraworld"). In this sense, Olivetto (2022) is also correct in understanding that what was posed twenty years ago as a life-and-death struggle between the real and the virtual (this one was meant to displace and ultimately exterminate the real) cannot be comprehended that way today. We must transcend the Aristotelian logic of the excluded third: it is not one thing or the other (A and not-A cannot both be true at the same time), but rather: better put one thing and the other, in mutual collaboration.

In this context where we discuss the needs for immediate transformation in education, we have seen how the metaverse, artificial intelligence, and emerging technologies cast shadows in the cave of the unknown. We proposed that

leaving the cave means departing from the labyrinth. We can only achieve this if, as educators, we engage in change and embrace these new immersive territories by means of a new neuro-techno-pedagogical model, as a compass to teach how to think about everything new that approaches at an unprecedented pace.

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If we interpret the various technological elements as true extensions of our limbs, our brain, our abilities, as genuine prosthetic devices that enhance and develop our potential, rectify our shortcomings, or bring us closer to fulfilling our desires (we might even consider that they create these desires), it is time to discuss what Bostrom and Kurzweil have raised regarding the transhuman and posthuman. If the former is a human in transformation through technological mediation, the latter is, when definitively established, a natural-artificial being whose capabilities would far exceed those of the human as commonly known. And we warn about the need to get involved in these discussions because the future is already here, and avoiding the debate only keeps the multitude of benefits they offer, as well as the risks they entail, in obscurity.

Ed Finn, in his book "*What Algorithms Want*" (2017), features an epigraph that resonates with our point: "*If we wish to live with the machine, we must understand the machine, not*

worship the machine" (borrowed from Norbert Wiener[30]). In his work, Finn vividly highlights how algorithms govern our daily lives, preferences, environments, and decisions. He refers to them as "cultural machines" and exposes their leading role in shaping what we perceive as "reality." Hence, Wiener's quote is prophetic: "worshipping" technologies nullifies our reasoning and critical thinking, fostering a magical belief in attributing all virtues to them without nuances. Understanding them, on the other hand, implies thoughtful consideration: enjoying their benefits, utilizing them, immersing ourselves in their advantages, but with eyes wide open.

We are in an era marked by the advance of biotechnology, genetics, the pharmaceutical industry, and emerging technologies. Social networks dominate human interaction and have managed to generate a hypertrophy of desire. Technologies have colonized reality, for better or worse, even the reality of those who resist using them. They are ubiquitous, omnipresent, and tyrannical. Education, then, is once again facing significant decisions.

On one hand, today we have certain understanding through neuroscience about how the brain learns, a fact which provides us with a guide for an alternative transformation to traditional education. On the other hand, the metaverse is rapidly approaching, which is nothing more than a new, convergent and enhanced technology. Its main characteristic is to change the perspective of human connection, allowing us to engage ourselves in these new territories through digital immersion. If we manage to combine these two aspects in favor of thinking about new educational methods, we will make

significant strides in improving teaching, learning, and assessment processes.

This book is, therefore, an acknowledgment and a challenge: it affirms the confirmed intuition of a world that has changed, whose essence is undoubtedly change, driven by various technological devices. It also recognizes the pervasive infiltration, in all aspects of life, of a complex web of algorithms, metaverses, avatars, screens, and virtual worlds. On the other hand, it presents a challenge -that we cannot evade- to undertake a dual movement: to embrace change but to do so with a critical spirit.

Education, certainly -and hopefully, we've been able to explain this well- is not an island or running on parallel tracks that never intersect with the world. The final part of this challenge we pose is daring to envision an education for the 21st century: Will we rise to the occasion?

Countless shelves unfold before us, akin to those imagined by Borges in his labyrinthine library, filled with books of sand with infinite pages. We must dare to take the initial step. Perhaps not losing ourselves as humans among humans and for humans might be the compass that best guides us on this journey, which invites us to immerse ourselves in a space of opportunity and adventure for those of us seeking to educate and learn…

Notes

(30) Mathematician and American philosopher recognized as the creator of cybernetics.

Literature cited

Baricco, A. (2011). *Los bárbaros. Ensayo sobre la mutación*. Barcelona: Anagrama.

Baricco, A. (2019). *The game*. Barcelona: Anagrama.

Damasio, A. (2021). *Sentir y saber. El camino de la consciencia*. Madrid: Planeta.

Finn, E. (2018). *La búsqueda del algoritmo. Imaginación en la era de la informática*. Barcelona: Alpha Decay.

Harari, Y. N. (2018). *21 lecciones para el siglo XXI*. Madrid: Debate
Morin, E. (1999). *Los siete saberes necesarios para la educación del futuro.* Paris: Unesco.

Nussbaum, M. (2010). La crisis silenciosa. En *Sin fines de lucro. Por qué las democracias necesitan de las humanidades*. Buenos Aires: Katz Editores.

Olivetto, G. (2022). *Humanidad ampliada*. Buenos Aires: Planeta Said, E. (2004). *Humanismo y crítica democrática. La responsabilidad pública de escritores e intelectuales*. Madrid: Debate.

METAVERSES AND EDUCATION

The book **Metaverses and Education – How not to get lost in the new mazes of immersive virtuality?** presents a prospective, clear, and critical analysis of how this emerging technology will change in the coming years the forms of human interaction, connection, and personal development within synthetic virtual worlds.

The focus of study in this book lies in the development of the metaverse and its impact on the world of education, along with the imminent transformation that is required within it.

The present material suggests contemplating new logics for pedagogical contexts and how, from them, proposing new spaces for educational innovation that consolidate the understanding of new knowledge and promote the development of competencies through the planning and implementation of neuro-techno-pedagogical metaverse devices, involving immersive virtual spaces.