ISSN: 1130-3743 - e-ISSN: 2386-5660
DOI: https://doi.org/10.14201/teri.31730

# HUMAN TRANSFORMATION (HX) IN THE AGE OF AI AND THE CHALLENGES OF EDUCATION THROUGH THE POST-HUMAN DEBATE

## *La transformación humana (HX) en la era de la IA y los retos de la educación a través del debate poshumano*

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Date received: 21/10/2023
Date accepted: 10/01/2024
Online publication date: 04/06/2024

**How to cite this article / Cómo citar este artículo**: Suzuki, S. (2024). Human Transformation (HX) in the Age of AI and the Challenges of Education through the Post-Human Debate [La transformación humana (HX) en la era de la IA y los retos de la educación a través del debate poshumano]. *Teoría de la Educación. Revista Interuniversitaria*, *36*(2), 99-118. https://doi.org/10.14201/teri.31730

ABSTRACT

Concerning a posthuman perspective, this paper attempts to provide a new perspective on future changes in teaching and learning in the age of artificial intelligence. With the development of technological civilisation, humans have adapted to the environmental world while at the same time attempting to remould it using technology and tools. Humans have survived by acquiring new skills and abilities to manipulate technology and tools. Human Transformation (HX), updated to respond to technological innovations, is now upcoming human intellectual activities through AI technology. What are the challenges of HX in the age of AI, and what perspectives will be critical in this process?

This paper traces back to how machines with computational intelligence or reasoning functions were named 'artificial intelligence' that can reproduce human intellectual activities. It examines the wide-ranging social impact of the naming of AI and the growing phenomenon of expectations and anxieties about AI. It then notes two sources behind the posthuman debate. The first is the trend towards an upgraded stage of human intelligence over the current human by enhancing it through medical and even AI-based technology. The second trend seeks a new direction for post-humanity by focusing on its diversity, such as society and culture, through a critical examination of the view that uniformly evaluates all human conditions through a universal model of human beings. Navigating them is an excellent educational challenge. Focusing on the similarities and differences between human intelligence and artificial intelligence, the paper examines the challenges of education to develop the unique characteristics of human intelligence further and achieve freedom from AI technology, considering the legal, ethical and social issues (ELSI) of making wise use of AI.

*Keywords*: posthumanism; human transformation (HX); artificial intelligence (AI); human intelligence; ELSI; cultural learning; diversity.

RESUMEN

Desde un enfoque poshumano, este artículo intenta ofrecer una nueva perspectiva sobre los futuros cambios en la enseñanza y el aprendizaje en la era de la inteligencia artificial. Con el desarrollo de la civilización tecnológica, los seres humanos se han adaptado al entorno a la vez que han intentado remodelarlo mediante la tecnología y sus herramientas. El ser humano ha sobrevivido gracias a la adquisición de nuevas destrezas y habilidades para utilizar la tecnología y las herramientas. La Transformación Humana (HX), actualizada para responder a las innovaciones tecnológicas, se acerca ahora a las actividades intelectuales humanas a través de la tecnología de la IA. ¿Cuáles son los retos de la HX en la era de la IA y qué perspectivas serán fundamentales en este proceso?

Este artículo se remonta a cómo las máquinas con inteligencia computacional o funciones de razonamiento capaces de reproducir las actividades intelectuales humanas adquirieron el nombre de "inteligencia artificial". Examina el gran impacto social de la denominación de IA y el creciente fenómeno de las expectativas e inquietudes sobre la IA. A continuación, señala dos causas que están detrás del debate poshumano. El primero es la tendencia hacia un estadio superior de la inteligencia humana sobre el ser humano actual, mejorándola mediante tecnología médica e incluso basada en la IA. La segunda tendencia busca una nueva dirección para la poshumanidad y, para ello, se centra en su diversidad, como la sociedad y la cultura, mediante un examen crítico de la visión que evalúa con uniformidad todas las condiciones humanas a través de un modelo universal de ser humano. Navegar por estos principios es un excelente reto educativo. Con el foco puesto en las similitudes y diferencias entre inteligencia humana e inteligencia artificial, este artículo examina los retos de la educación para desarrollar aún más las características únicas de la inteligencia humana y lograr la libertad de la tecnología de

la IA, atendiendo a las implicaciones éticas, legales y sociales (ELSI por sus siglas en inglés) derivadas de un uso inteligente de la IA.

*Palabras clave*: poshumanismo; transformación humana (HX); inteligencia artificial (IA); inteligencia humana; ELSI; aprendizaje cultural; diversidad.

## 1. Introduction

The rapid advancement of AI technology is ushering in new opportunities and challenges for traditional education models. As the social implementation of AI advances, an interconnected network of AI through the internet is being constructed, causing significant changes not only in individual sectors such as production, transportation, finance, logistics, healthcare, caregiving, and education but also in industrial structures, labour markets, and even societal institutions and organisations. Collaboration among humans, objects, and machines and systematising processes from manufacturing to distribution leads to increased automation and autonomy.

However, we must remember that concerns often accompany expectations for new technologies. As automation and autonomy progress in AI-equipped machines, there is an increasing demand for security measures, accident prevention, and responsible control structures. Additionally, there is an urgent need for legal frameworks to protect personal data and copyrights. Furthermore, as advanced AI begins to replace tasks traditionally performed by humans, the forms of labour-sharing between humans and AI are diversifying.

With the advancement of AI capabilities, there is growing concern that AI might replace many human jobs (Frey & Osborne, 2017). Additionally, experiments have emerged to achieve a post-human or transhuman existence, such as embedding AI chips into the human brain to attain longevity and enhanced cognitive function. Futurists like Ray Kurzweil have even suggested that technological singularity, where AI surpasses human intelligence, might occur around 2045 (Kurzweil, 2005).

The question arises: What tasks can only be performed by humans, and what does labour mean for humans? Amid growing expectations and concerns about new technologies, issues related to human-machine interfaces have emerged, prompting a reconsideration of human characteristics and what it means to be human. In a future situation where there is a mix of stages where humans utilise AI as a tool, where humans coexist with AI in an AI-embedded environment, and where AI functions as part of the human body, such as with an AI chip implanted in the brain, does AI have the potential to shift from an automated state to an autonomous state, like humans?

AI technology is on the verge of replacing human physical labour and a portion of cognitive human activities. Some have even suggested that human beings may enter a new phase, known as the "posthuman" or "transhuman" stage,

as they acquire new possibilities through the integration of AI (Lamb & Higgins, 2020; Ferrando, 2019; Fukuyama, 2002). How will humans be transformed as AI technology advances and AI increasingly replaces functions? Humans have been transformed through various technologies in the past, but will they be further transformed as a species in the future by acquiring AI technologies that can replace their own intellectual and mental activities? This question poses a new challenge to philosophy and pedagogy, which have sought to elucidate human existence and human generative transformation.

In 1776, Immanuel Kant stated in his "*Lectures on Pedagogy*" that "Man can only become man by education" (I. Kant, 1992). Education is essential for individuals born into this world to adapt to the culture and society constructed by humans and to prepare for the future. Like an oxymoron, this statement has been the cornerstone of modern educational theory, emphasising the potential and necessity of education. Does the discourse of posthumanism challenge the human image underpinning modern education? Integrating a posthuman perspective with AI technology is a critical discussion in the context of education in the AI era.

This paper explores the direction of Human Transformation (HX) in the age of AI and educational challenges by integrating posthumanism and digital technologies, including AI, to construct a more effective and inclusive environment.

To achieve this, the paper first sheds light on AI technology, which stands out among digital technologies due to its accelerated innovation and widespread societal implementation. Reflecting on the societal phenomenon brought about by the term "artificial Intelligence (AI)," the paper compares and examines the functions of artificial and human intelligence. It addresses the gradual approximation of reproducing human behaviour and the AI technological innovation attempting to surpass human functions. In the context of redefining humanity, the paper presents several crucial perspectives amid the acceleration of AI innovation that aims to redefine human nature.

It then reflects on the two established perspectives commonly found in today's discussions on posthumanism, considering the relationship between humans and technology. Finally, by redefining humanity, the paper discusses various points for achieving more effective and inclusive education through integrating posthumanism and AI technology. The paper hopes to contribute to discussions on reshaping education in the era of AI technological civilisation by redefining humanity.

## 2. AI VERSUS HUMAN BEINGS BETWEEN AUTOMATION AND AUTONOMY

### 2.1. *The Name "Artificial Intelligence"*

How do the thinking processes of AI and humans differ? To explore this, it's worthwhile to trace the origin of the name "Artificial Intelligence.

The term "Artificial Intelligence" as we know it today was first used during the "Dartmouth Summer Research Project on Artificial Intelligence" held in 1956. During this conference, attended by researchers such as John McCarthy, machines equipped with reasoning abilities were called machines with artificial intelligence (McCarthy et al., 2006). Even today, researchers have yet to determine the definition of AI. Generally, AI is understood as the technology of creating intelligent machines and brilliant computer programs. Human intelligence or intelligence has already been studied in philosophy, psychology, neuroscience, and other fields. As the term 'artificial intelligence' has become popular without a stable definition, we must consider human intelligence compared to AI.

Considering how humans adapt and acquire survival skills while interacting with their environment, it is not straightforward to distinctly separate natural or human intelligence from artificial intelligence, which incorporates acquired skills. However, within this ambiguity, AI has evolved and has been studied conceptually according to human brain function to create computers that think like humans. Research projects in the 1960s laid the foundation for neural network research, logic neuron models, programming languages, autonomous mobile robots, natural language dialogue systems, and other fundamentals of today's AI research. Furthermore, in the 1970s, expert systems that mimic specialist behaviour were developed. AI has become more capable and applicable in various fields with advancements in machine learning, deep learning, and image recognition technology (Stanford Univ., 2016).

Today, the name "AI" has become widely known, and many AI-related products have reaped the benefits of its promotional appeal. Today, the term "AI" is commonplace and stirs expectations and concerns among people. Similarly, the concept of "learning" in machine learning, though referring to only a tiny part of human "learning" that consists of complex elements like cognitive and experiential learning, has become an established technical term. AI research and development have progressed toward emulating human brain functions to achieve pseudo-human capabilities. Due to this focus, concepts such as human learning and intelligence have been repurposed in AI descriptions, leading to a semantic shift. This situation warrants the attention of education specialists. Therefore, it is necessary to alert the potential misconception that AI's learning and memory functions are much the same as those performed by humans when they represent only a fragment of human learning and memory processes (Dreyfus, 1978). This is because this tendency to anthropomorphise AI is likely to be spurred on by confusion in the balance of relationships when humans work with AI.

The technological innovation in AI is accelerating, and data processing speed is improving dramatically. In particular, the development of large-scale language generation models like ChatGPT, introduced in November 2022, is so fluent that it may create an illusion of thinking and forming words like a human.

However, the generative AI merely guesses and generates the following words. Nevertheless, the smoothness of its responses results from extensive data learning. As Generative AI becomes increasingly integrated into applications like avatars and conversational robots, it has the potential to facilitate more natural communication, making users feel as if they are interacting with entities that have emotions.

We briefly reviewed the process that has propelled the term "AI" in a direction powerfully evoking similarity between AI and humans. The expectations and fears associated with AI have, to some extent, increased within the image crafted by the very name "AI." The anthropomorphism of AI can be seen as influencing our current perception of AI.

In such a context, there might be instances where one could mistakenly perceive machines as human, believing they are capable of similar responses. Examining human traits, such as sensitivity to environmental changes, being influenced by emotions, having fluctuating moods, and being unpredictable in producing consistent outcomes, some may find it prudent to rely on the automation, regularity, and stability of machine functioning as an information processing system.

As we move forward, the integration of AI with programs that enable seamless communication in industries requiring human interaction, such as care, nursing, education, and services, is on the rise. Research and development efforts are advancing towards realising AI capable of precisely mimicking and replicating human behaviour. However, we must consider what tasks and responsibilities we will delegate to AI (Friedman, 2023).

### 2.2. *Human intelligence and artificial intelligence*

In artificial intelligence research, efforts are underway to create machines modelled after humans, capable of acquiring language skills like humans, perceiving the world through their organs, and engaging in thought processes across the entire spectrum of human cognitive activities. However, it's important to note that what is being developed in this context are machines that behave or function as if they possess consciousness and emotions. Machines that learn like humans need to comprehend the process of acquiring language skills and learning as humans do (Baker, 2016). However, AI only works automatically as a programmed thing, whereas humans work autonomously, making their judgements, decisions, and actions.

Whether AI can advance to replace intellectual activities depends on whether humans are merely "information processing systems" or something more profound. If humans are nothing more than information processing systems, the next stage could be the post-human stage enhanced by AI technology, where humans become machine-enhanced entities. However, the intelligence of humans as organisms is

shaped by encountering complex situations and scenarios that far exceed the anticipated scope of AI development. Humans navigate their learning processes through these complex issues. While humans also process information, they do not necessarily process it in the same way as computers. Therefore, even if a stage comes where humans collaborate with and coexist with AI, becoming part of the man-machine system, it may be the stage of the unreplaceable post-human, shaped by machine but irreplaceable by it (Fink, 2012).

The next challenge in exploring human nature is to shed light on the characteristics of human intelligence or bio-intelligence that set humans apart from AI while comparing the two. First, to elucidate human learning, it is necessary to reevaluate the widely accepted conceptualisation of intelligence or ability in education and psychology. Intelligence has traditionally been perceived as an attribute of individuals independent of their cultures, understood to be transmitted through genetics from parent generations to child generations and beyond. When assessing the developmental stages of intelligence, we typically judge whether a particular ability is present and to what extent that ability has been acquired. In making these judgments, we predefine tasks that can be accomplished using the specified ability, and we adopt the results of whether the individual has successfully performed these tasks as evidence. In other words, by visualizing the performance of completing a task, we have measured the existence of abilities and the extent to which those abilities effectively contribute to task accomplishment (Weizenbaum, 1976).

To focus on the multifacetedness and diversity of the modalities of intelligence expression, it is necessary to confirm that the way of perceiving intelligence and the criterion axes of intelligence assessment pointed out above have been bound by the following conditions. It is an implicit condition that we, as beings on Earth, operate under the rule of gravity, have physical bodies, and live in this world for a limited time. In other words, it is nothing more than a condition for living and acting while bound by gravity on Earth.

In other words, this is our cultural and social environment, encompassing human thoughts and behaviours. It implies that individual intelligence or abilities, manifested by each person in any situation, are influenced by and inseparable from our cultural and social context. It challenges the idea that intellectual development occurs as an internal transformation within an isolated individual's body, observed chronologically as changes over time. It seeks that human creativity relies not only on intelligence, reason, and cognitive abilities but also on the interplay of various elements such as insight, sensibility, intuition, and even embodied knowledge. In essence, it proposes that human creativity depends on the interaction of diverse factors, not limited to cognitive aspects, but also incorporating "what other to reason" (Böhme & Böhme, 1985) like non-cognitive functions, emotion, intuition or "tacit knowledge" (Polanyi, 1962, 1966).

Shedding light on human intelligence's characteristics involves understanding systems beyond AI-reproducible information processing systems within human intelligence. To this end, it is necessary to fully use the knowledge gained from previous intelligence research, focusing mainly on systems that function in conjunction and interaction with information processing systems and delving further into areas that are difficult to reduce to machine information processing systems.

While the process of human socialisation is rooted in the shared biological structure of all humans, it is also heavily influenced by culture. For example, in communication, we utilize not only verbal methods of conveying intentions but also non-verbal communication methods, such as the distance at which we open or close our hearts, emotional expressions, facial expressions, gestures, and more. The latter forms of communication are acquired by observing and imitating the behaviour of others within society and culture (Suzuki, 2023). Behind the learned behavioural patterns lies the anthropological aspect of ritual elements, such as customs, traditions, and values, which have been maintained and passed down over the years in each society or culture. Rituals are continually updated to meet the needs of the times and situations and the judgment of individuals performing these rituals while maintaining the fundamental guidelines that should always be followed. Simultaneously imitating past patterns, modernisation is taking place within these rituals. A child growing up in a cultural context involves learning the specific rules of that culture and observing or participating in the process of these rules being updated as living guidelines for the next generation. This cultural learning process becomes an experiential journey for children as they observe or actively engage in these rituals, ensuring their adaptation to the evolving cultural norms (Wulf, 2013).

It will be essential to bear in mind that human transformation is not only an aspect of the uniform functional evolution of humanity derived from the universality of science and technology but also an aspect of the diversity of human life through socialisation and enculturation. This is closely related to the perspective on technological innovation, which significantly impacts HX. The vision of what kind of society and world humanity wants to realise through technological innovation is indispensable.

The social implementation of AI and other digital technologies aims to develop society in a desirable direction and to expand human potential desirably. Socialisation and acculturation are deeply related to the vision of the future we wish to realise through technology. Therefore, AI research, development and utilisation are premised on a shared vision of the desired future society and human beings.

Considerations of ELSI (Ethical, legal, and social issues) have been ongoing within international organisations like the OECD, UNESCO, and European Commission, as well as research groups and corporations. These discussions include respecting human dignity, building trustworthy relationships between AI and humans, and

visualising AI's black box to ensure transparency. All these principles remain based on a "human-led" or "human-centred" framework (OECD, 2019; UNESCO, 2021; European Commission, 2021). Nevertheless, despite these discussions, viewpoints and understandings of the world and humanity prevalent among AI technology advanced nations and major IT corporations often take precedence. As a result, debates and conversations that consider the lifestyles rooted in the local culture and religion of different regions and territories are often disregarded, overshadowing the uniformity of the progressing global technological civilisation (Ess, 2006). AI can be a reflection of humanity. Accumulated data in the cyber world, laden with prejudices and preconceptions, often reflects the thinking and values of humans moment. Furthermore, historical documents from the past store value systems that would today be considered controversial, all without proper distinction. AI could inadvertently utilise these biases in data as learning resources. Additionally, researchers writing algorithms can unintentionally introduce their own biases. There is a significant issue surrounding improving the value balance of the data that forms the basis of AI, especially as the movement to correct historical value systems that are unacceptable from today's standpoint and are unfit for humans gains traction. This can be achieved by teaching AI data based on a fair and balanced worldview and understanding of humanity (Couldry & Mejias, 2019a, 2019b; Awori et al., 2016; Berberich et al., 2020).

## 3. Two perspectives of post-humanism

To understand the impact of the social implementation of AI on HX and to identify the issues that need to be addressed to accept it as a new challenge for education, it will be necessary to explore the background of the debate on posthumanism in detail. The first background is to create a new species of post-human by improving the function of human beings as individuals through technological enhancement (Hassan, 1977; Pepperell, 2003). The second background is a critical examination of the universal human model that has been the basis of human inquiry in the modern academic paradigm, focusing on the diversity of human beings. This is being developed in the humanities, social sciences, and the arts against modern rethinking and postmodern thought currents, including post-colonialism, gender debates, and the Anthropocene. The common thread here is the perspective of moving beyond the traditional human model, aiming for a new human model that surpasses it. In this context, posthumanism seems to function as a metaphor for critiquing conventional norms in science, hinting at the complexity and diversity of human existence, including aspects such as race, gender, and class that were overlooked and forgotten without being brought to the forefront in the existing human model, which is now disappearing. (Chaudhry & Kazim, 2022; Cord, 2022; Susen, 2022).

These two distinct posthumanism ideas are associated not necessarily with each other but somewhat entwined with separate social movements, diverse theories, and domains. Surveying the entirety of what constitutes the reference unit for human beings goes beyond the scope of this paper. Instead, I aim to illustrate the interconnection between the advancing progress of digital technologies, including the rapidly accelerating AI, and the discussions surrounding the direction of technological innovation and posthumanism.

### 3.1. *Post-humanism in relevance with HX by Technological civilization*

Human Transformation and inclusive evolution have been closely intertwined with technological civilisation. In its early stages, humans, like other animals, coexisted within the natural environment. Through interaction with this environment, humans developed a secondary environment, often called the human-nature or ecosystem systems. This development involved accumulating knowledge and skills required to use tools, including a broad range of technologies (technai), and getting expertise, experiential knowledge, and mechanisms for transmitting and inheriting these technologies (Medawar, 2018).

Humans build a relationship with tools by using them and develop an art of mastering auxiliary or augmenting tools. They cultivate knowledge, skills, and abilities required for effective communication with tools in their interaction. This process involves humans acquiring knowledge and skills for communication with tools and machines, transforming their capabilities. Highly practised skills are refined through repetition, while skills no longer used are gradually forgotten. In the context of technological civilisation, one can view humans as constantly reshaping their powers and capabilities through tools and machines (Stiegler, 1998; Suzuki, 2020).

As bearers of technological civilisation, humans do not always consciously choose which technologies and skills to adopt. Instead, they respond to the demands of their respective civilisations and are incorporated into them. In a context where technological civilisation constantly seeks renewal and advancement, discussions are needed to shed light on humans who find themselves in constant change and adapt to and influence their environment, essentially creating a second environment, often called technological civilisation.

Civilisations that have developed through responses to regional and cultural realities and their challenges have become more homogeneous since the emergence of modern technological civilisation, closely linked to the development of technology based on current scientific thought. The appearance of modern technological civilisation, connected with the scientific revolution of the 17th century, led to increasing homogenisation. Empirical, rational, and reductionist methodologies were established in scientific research based on formulating and verifying hypotheses.

Technological civilisation distanced itself from regional and cultural diversity that was included in civilisations in general. In the context of the systematised scientific method, technological civilisation used objectivism, rationalism, and reductionism to establish a methodological framework for scientific research, where hypotheses were formulated and tested. In this context, it is possible to view technological civilisation as distancing itself from regional and cultural diversity and, in other words, away from the daily practices inherent in general civilisations (Kuhn, 1962; Mendelssohn, 1977).

The dreams of creating artificial/ cyber humans have been fuelled in recent years. Recent advances in cutting-edge scientific and technological fields such as genetic engineering, robotics, nanotechnology, and superintelligence have led to increasing attempts to develop superior life forms (Hayles, 1999; Bostrom, 2014; Bredenoord et al., 2010). Humans have evolved as part of a man-machine system through skill acquisition. Haraway points out that humans are chimaeras with machines (Haraway, 1994). Recognising this while contemplating the future, we may envision a post-human era for humanity as chimaeras with machines. The boundaries between humans and machines will likely become increasingly ambiguous in the future, as suggested by Harari (Harari, 2017). Against this backdrop, what is human and what is humanity? Humans have a habit of constantly questioning who they are. In the past, we have tried to clarify our human existence by drawing boundaries between angels, animals, and machines. And now, as the boundaries between us and AI blur, we are being asked what it means to be human, to remain human, or, as Kant put it, to become human.

The possibility that a new path to human development can be opened through acquiring skills to use AI technology effectively cannot be ruled out. Furthermore, today, there is a strong trend towards enhancing human function through technological intervention. In the first place, enhancement means functional improvement and functional enhancement. Enhancement in the sense of helping people who have been disabled since birth to move from a negative state to fulfilling primary living conditions, such as being able to live like everyone else, supporting independence and going to school, and using medical enhancement, is socially acceptable.

The same applies to enhancements for people with difficulty performing daily activities due to accidents or ageing. Enhancements for those working in care and nursing settings to assist with activities such as supporting, turning, and bathing patients and loading prosthetics, artificial limbs, artificial eyes and other orthotics will likely have their needs agreed upon.

Regarding gene-related technologies, such as gene therapy to eliminate the risk of future diseases or technological intervention through prenatal genetic diagnosis, it can be said that the situation is a little complicated to achieve a state that is acceptable to the general public other than those directly involved, even though

the sincere wishes of the people concerned and the desire of the medical profession to help them may be in agreement. However, the situation is a little more complicated to achieve a situation acceptable to the public outside those directly involved. This is because the extent of the possible effects of artificial intervention on genes has yet to be fully understood. Genes are inherited not only in the body of the patient being treated but also in the patient's children, grandchildren, and several generations to come. To what extent will the effects of human intervention be felt in the next and succeeding generations, and whether there will be any side effects is unpredictable without some degree of prediction. Genes may also have a negligible impact on other genetic parts of the body.

In the face of technology that must be considered under a long-term system of responsibility, or, to put it another way, technology that has exceeded its life-size, we have many things to consider, such as what and to what extent we should acknowledge and prepare for as the extent of our responsibility, and, having acknowledged the duties that our generation of professionals can assume and those that they cannot, what kind of system we should build for the responsibilities that our generation cannot assume.

There is also an implicit assumption that enhancement should not be an intervention that results in losing a person's identity as a human being. Such a technical intervention is a matter of personal dignity, as it changes the person so much that they can no longer be identified as the person they are. The question is the possibility and relevance of technological interventions to realise the posthuman stage.

### 3.2. *Post-humanism as a metaphor for beyond the traditional unified model of human*

To contemplate the future of education in the posthuman era, it is essential to continuously examine the possibilities and validity of enhancing human functions in tandem with the rapid technological advancements mentioned earlier. Additionally, one must consider the combination of challenges involving embracing the diversity of values from humans, living beings, and inanimate objects and creating a world and educational environment that accommodates such diversity.

As mentioned in the preceding section, alongside the perspective focusing on technological innovation, another viewpoint shifts attention from the conventional understanding of humanity based on a universal human model. Instead, it focuses on aspects such as the expressions and ways of interacting with the world seen in human behaviour, emphasizing the diversity of humanity. Under the recognition of an era where humanity, through the creation of technological civilization, has become a force shaping the future of all living and non-living entities on Earth, the exploration of what it means to be human has gained increased significance. In this age where humanity plays a pivotal role in determining the future of all entities on Earth through technological civilization, it is crucial to expand and deepen insights

into the role of humans. We can broaden and deepen our understanding of the human role on Earth by probing questions such as "What is humanity?" and "How can one better understand oneself?". Only by delving deeper into self-awareness and utilising that knowledge to alter our behaviour can humanity contain the threats it has brought upon itself. The risks arising from industrialization, the progress of capitalism, and the acceleration in various aspects of life endanger human existence and threaten the survival of all entities inhabiting the Earth.

The Earth faces many challenges, including climate change, the collapse of biodiversity and biogeochemical cycles, environmental pollution, and the destruction caused by non-renewable energy sources. The warning against anthropocentrism becoming a human-centric ideology, where only the well-being of humans matters, is fundamental to the discussions in posthumanism. In such contexts, the Anthropocene is perceived not just as an epoch to be overcome but has led to the creation of numerous derivative terms, including "Capitalocene" (Moore 2017), "Chthulucene" (Haraway, 2016) and others.

The proliferation of such neologisms indicates the need to reconsider the constitution and functioning of living and non-living beings, arising from a critical perspective towards the worldview that needs to be overcome. The question posed about humanity involves acknowledging the transformations in various aspects of human life due to societal changes and recognising it as a crucial challenge for the upbringing and education of the next generation.

Exploring human existence is a fundamental philosophical inquiry, and philosophers from diverse backgrounds have sought to elucidate common characteristics shared by humans and extract their universality. Conversely, perspectives assert that such so-called "universal models" are biased by 'the objectivity equal universality' and are influenced by the biases of the times, societies, and cultures. Some argue that these models, entrenched in specific values such as colonialism, gender discrimination, and racial prejudice, should be re-examined (Mohamed et al., 2020). In this view, the concept of "humanity" is seen as defining the conditions historically set to be considered as "human," and the so-called "universal human model" has been used to categorize and oppress those deemed "non-human," creating divisions among different human groups.

This perspective highlights the exercise of various forms of societal oppression through the categorization of "human" and "non-human" based on values that have historically been dominated by Western supremacy, patriarchal systems, and other prevailing ideologies (Ashcroft, 2006). The ongoing discussions that critically examine existing human models seem to use the term "posthuman" metaphorically, not merely to depict a new human or posthuman image concretely but rather to signify something that is not yet present.

In attempting to question oneself in response to the complexity of the current era, a variety of perspectives from disciplines such as philosophy, psychology,

behavioural science, archaeology, biology, cultural anthropology, linguistics, and more can be helpful. Moreover, engaging with diverse values stemming from different social and cultural backgrounds is essential to relativize the implicit values one unconsciously carries since birth. The ability to comprehensively understand human beings and their behaviour in this world by combining multiple perspectives might enable timely actions to alleviate the threats faced by the Earth.

In the current era of accelerated technological innovation, as mentioned earlier, there is a simultaneous progression towards the diversification of information sources and the pluralization of information channels. Conversely, due to an information-poor power balance, phenomena such as centralization of information, information manipulation, and information guidance leading to unification must be allowed. Enhancing various fundamental functions, such as an individual's task performance capability, through technological innovation is a transformative journey for humans toward the posthuman stage. Skills and abilities frequently employed tend to increase proficiency and development, while those no longer in use gradually fade from memory. Following the process of rearranging these skills and abilities, which accompanies the progress of technological civilization, and adopting a diachronic perspective to understand the state of everyone over time is crucial. Simultaneously, a synchronic perspective is necessary to comprehend different others and alternative entities sharing the same time. By intertwining diachronic and synchronic perspectives toward humans, a more comprehensive outlook is generated on human behaviour and human beings. Human exploration can be seen as an inquiry into the characteristics inherent in humans, namely, the "unity in diversity" (unitas multiplex).

## 4. The challenges of education through the posthuman debate in the age of AI

Looking back at the debate on what comes after humans and post-humans and the background to this debate, we have explored perspectives on HX and the clues for looking to the future of education from this perspective. What emerges from this is whether humans can continue to be human as we understand them today. Will we still belong to the same category of human beings as we are today and still fit into the category of human beings as so-called Human 2.0, even after functional enhancements and the acquisition of functions as man-machine systems?

This section presents some challenges from my perspective that education professionals will face when imagining the next generation of education, based on the assumption that humans will remain human in the broadest sense of the category while being influenced by the posthuman debate. I will also briefly discuss

the possibilities of tackling these challenges by reviewing the knowledge we have already accumulated in confronting them.

### 4.1. *Cultivate resilience in the face of technological innovation*

First, it is necessary to create a situation in which people can manage technology wisely, even when the overall flow of technological innovation cannot be stopped, i.e. to free themselves from the tendency to depend on technology by securing a position in which they can fine-tune technological progress and its direction. Acquiring the skills and capabilities to use new technologies is essential. At the same time, it is necessary to adjust the balance so that people are not used to technology. This requires resilience in the face of technological innovation (OECD, 2021).

At the same time, it is necessary to be aware of the skills and competencies related to old technologies that are being forgotten as new technologies are used. In situations where power supply becomes difficult through disasters or conflicts, societies and people who are too dependent on digital technology based on securing power will be at a loss. Education must also look at old skills and abilities that are somehow lost without ever being used, and at the very least, through fixed-point observations of human skills and abilities, grasp how humanity is recombining them in adapting to or building the environment. In some cases, newly acquired skills and abilities may function better using older skills and abilities. In addition, to become aware of the state of habitual dependence on digital devices, it may be helpful to impose on oneself a period, such as two or three days or a week, in which one does not touch digital devices, to become aware of the digital dependence of one's lifestyle, and to try to achieve a balance between analogue and digital thinking. This may be an effective way to balance analogue and digital thinking. The future of pedagogy requires a perspective that expands the scale of the time-space scale, which considers the progress of technological civilisation to date and looks forward to the transformation of human beings.

### 4.2. *Rethink the way we perceive skills and capability*

Today, when we are constantly connected to various information devices and make full use of them in our daily lives, can we continue to think of human abilities and skills in the same way as before? In school education, competence has generally been assessed based on the performance of specific tasks tangibly. The assumption was that competence was seen as something that belonged to the inner life of the individual human being, the person as an individual unit. However, in the world of the era of digital transformation, where people and people and things are closely connected, it will be necessary to grasp human abilities and

skills from a new perspective, such as the achievement of tasks in collaboration with AI as a man-machine system or the joint management of functions within a collective agreement. The so-called "infosphere" (Floridi, 2014), composed of data and information, can be considered environmental intelligence. The perspective of looking at human functions as an actor in this ecological intelligence will also impact how human abilities and skills are perceived (Adams et al., 2021; Taylor & Hughes, 2016).

At the same time, it is necessary to re-examine the function of group learning and rediscover its significance. This is the significance of 'face-to-face learning', sharing the same place and time. The author has conducted a comparative field study of Japanese and German schools using historical, anthropological methods conducted with the Free University of Berlin. For example, from the perspective of the Japanese-German field research, the classroom can be seen as a stage in the sense that it is a place of communication between teachers and students, resonating through the interaction of various performances and creating a 'place' for learning. Classrooms can be seen as stages in that they resonate through the interaction of multiple performances and create a 'place' for learning (Suzuki, 2019).

The repetition of communication and performance between pupils and between pupils and teachers becomes a behavioural pattern or habit, which, from an anthropological perspective, takes on a kind of ritualistic character. It is inherited through mutual imitation in the group and is updated, modified, and edited to match the needs of the times and circumstances Wulf, 2013). In this sense, the school is a place or stage where diverse learning can be experienced. There, elements deeply related to non-verbal and non-cognitive skills, such as physical and tacit knowledge, play an important role, such as non-verbal communication, a-un breathing, mutual gestures, facial and body expressions, and tone of voice.

Given the rapid progress in the development of AI, which is rapidly advancing in the direction of imitating human behaviour and reproducing it in terms of computational intelligence, it is important to shed more light on cultural learning, also known as non-cognitive learning. By focusing on the workings of human intelligence, which cannot be replaced by artificial intelligence, we may be able to find the last bastion of human nature. Sensitivity and the ability to sense beauty, which works differently from reason, practical intelligence that makes decisions in situations, phronesis, tact as tactile intelligence (tact or tactfulness), and tacit and bodily knowledge fall into such a category (Polanyi, 1966; Suzuki, 2022).

### 4.3. *Integration of attempts to optimise learning individually and guarantee diversity in learning*

With the use of AI, education is moving away from the one-size-fits-all approach often found in group learning to achieve individual optimisation of learning, such

that the individual needs and styles of learners are respected. Through individual optimisation of learning, education can be more targeted and tailored to individual interests and learning aspirations (Ahmad et al., 2023).

At the same time, education is about transmitting knowledge and co-creating with learning peers and experiencing different learning styles and ways of understanding diversity from their own. By respecting and integrating different cultures, languages and values into educational programmes, learners relativise their cultural identity and learn respect and esteem for different cultures. As a result, education will move from the mere transmission of information to the collaborative sharing and creation of knowledge, stimulating the promotion of new ideas and projects in the educational field. Recognising that education is a process of knowledge co-creation, AI technologies will support large-scale data analysis and collaborative projects, providing a platform for learners and researchers to form knowledge and generate new ideas jointly. This nexus will open new knowledge-sharing and creation possibilities, making future education more creative and innovative.

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