At the dawn of humanisation: *Culture* casts a polyhedral shadow, the female gender and teaching practice

Al alba de la humanización: Cultura proyecta sombra de poliedro, género de mujer y práctica de magisterio

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Abstract:

The most commonly used meaning of the word *culture* relates to objects: the production-creation of cultural objects, knowledge, and institutions. The invention of the term involved a metaphorical transfer, which did not consider processes linked with child rearing; agents involved, especially women and teachers of basic skills, were forgotten. We argue that teaching of knowledge, skills and valuations are fundamental in the development of the human mind and come together in the concept of teaching or education. Women and teachers played a leading role in this scenario and patterns of development-upbringing were a fundamental stage. We have built our proof using overlapping historical and anthropological data that allow us to conclude that teaching is a distinguishing feature of the genus *Homo*. *Homo docens* might offer a perspective for the elaboration of an anthropology of education.

Keywords: anthropology of education, child rearing, teaching, women, culture.

Resumen:

El significado más atribuido a la palabra *cultura* es objetivo: la producción-creación de objetos culturales, conocimientos e instituciones. En la invención del término ocurrió una transferencia metafórica que no puso atención a procesos asociados a la crianza; olvidó actores, especialmente mujeres y docentes de primeras

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letras. Defendemos que la enseñanza de conocimientos, habilidades y valoraciones son primarias en el despliegue de la mente humana y se reúnen en el concepto *enseñanza* o en el de *educación*. En este escenario, las mujeres y los maestros ocuparon un lugar protagonista y los patrones de desarrollo-crianza un estadio fundamental. La demostración la construimos con datos históricos y antropológicos convergentes, los cuales permiten concluir que la enseñanza es un rasgo diferencial del género Homo. *Homo docens* puede constituir un punto de vista en la elaboración de una antropología de la educación.

Descriptores: antropología de la educación, crianza, magisterio, mujeres, cultura.

1. Introduction: the shadow of the polyhedron

Culture is the feature that best defines human nature. Defining terms involves setting limits on meaning to give a word relevance (Sperber & Wilson, 2005); to some extent it encloses the word, transforming it into a *term* for consistent reasoning. Kroeber and Kluckhohn (1952) collected and classified hundreds of definitions (Colom Cañellas, 1980; Bouche et al., 2002; Pérez Alonso-Geta et al., 2011; Colom Cañellas & Lizón, 2016). Why so many if the idea concept it refers to seems so clear?

Although the mind encounters facts and refers to them, it bases its interpretations on the shadow that the fact casts on it. This representation is fallible in all cases and can be improved by correcting or adjusting perspectives or viewpoints (Ortega y Gasset, 1970). *Human nature* is one of those terms we often see in writing and which everyone understands based on their own particular focus, perhaps because of the complexity of the trait we pay attention to when characterising the *human genus*. For this reason, practising philosophy is equivalent to constructing and developing hermeneutic transformations (Conill, 2018).

Nobody nowadays doubts that the genus *Homo* includes many species. According to C. J. Cela and F. Ayala, it comprises as many as five hominid genera, each of which is made up of multiple species; what is truly common to all *humans* is walking upright (2021, p. 19). Also, they are all cultural animals. These authors attempt to overcome the polysemy of the term culture by proposing a "strict meaning, that of the set of tools and techniques" (2021, p. 56)[1]. They go on to state that, when their use "becomes a common practice for a whole group, this is culture" (2021, p. 20).

From the point of view of pedagogy, these are two different systems comprising complex processes: the processes of creating and using cultural objects and the processes of transmitting skills and competences (Wenger, 2001). Which of these two processes can be used to define culture? To decide, we will go back in time in order to give as a perspective. This is what Sara Blaffer Hrdy (1946-), an anthropologist

and primatologist and professor emerita at the University of California, Davis, does: she examines the evolution of forms of behaviour. She does not ask *what* human beings are, but rather *how* we have become human beings. Therefore, she does not run into the artefact; instead she discovers the significance of empathy (Hrdy, 2016), a qualitative development that emerged long before the invention of the stone tool.

In contemporary writing on anthropology it is common to refer to culture with the sense of the creation of *cultural objects* and their collection-accumulation. The oldest meaning of the term referred to intersubjective teaching-learning processes, a social area of cooperation, and essential help for developing the mind. Here we argue for the pedagogical suitability of this perspective, as it does justice to the importance and merit of the actors in the development of this way of being.

1.1. Specific properties of our culture

When the chosen perspective — a pedagogical one — is the social field of the construction of the subject (Newman et al., 1998), the qualitative innovation that culture displays in all humans is that it establishes itself as a bio-ethological need: people cannot live outside this intersubjective scenario or the damage leaves them anthropologically unrecognisable (Curtiss, 1977; García Carrasco, 2007). With this focus, matters closely related to an anthropology of education become relevant: accessibility, availability, *sustainable* and *unsustainable culture*, cultural *circumstances* (such as those of emigrants or the abandoned), cultural *incidences* (such as invasions, pandemics, overpopulation), cultural *coincidences* (like multimedia culture), and cultural *eventualities*.

We define these eventualities as qualitative novelties that gave rise to true discontinuities in cultural evolution, such as the emergence of language, the invention of writing, or the invention of computing. We believe that the first great cultural eventuality linked to evolutionary divergence on the primate line must have been the emergence of teaching, the appearance of teaching-learning skills: a pedagogical eventuality. Within animal evolution, culture applies relevant processes of stimulus, mimetism, learning. On the hominid line, the qualitative novelty of teaching emerged: a planned intentional behaviour to ensure that another person learns, guided by motivation and perception of states of competence (Dennett, 2017). In this sense, M. Tomasello offers an anthropological approach to culture, taking cooperation as his framework of reference. In it he finds (Tomasello, 2010): "The cultural origins of human cognition", of thought and human morality (see also Tomasello, 2007, 2017, 2019). His approach revolves around the term *cooperation*; we have only found one explicit, incidental, reference to teaching in his discourse.

Many biologists affirm that biological evolution works in our species to "preserve and augment the human ability to create, absorb, and transmit culture" (Broswimmer, 2002, p. 13); other authors believe that culture turned sexual differences (sexual dimorphism) into qualitative gender attributes (Shlain, 2000).

2. The scenario of the culture of tools had to involve teaching

It was long thought that human ancestors from between 6 Ma and 3.4 Ma left no evidence of the creativity of their minds. This is precisely the epoch between Lucy (3.9-3 Ma, *Australopithecus afarensis*) (Johanson & Edey, 1993) and Toumai (6-7 Ma, *Sahelanthropus schadensis*) (Brunet, 2016, 2018). In 2011, an excavation led by Sonia Harmand (1974-) and her team, to the west of Lake Turkana (Kenya), discovered very crude stone tools dating to 3.3 Ma (Harmand et al., 2015): this is the oldest stone production site yet discovered. This is the Lomekwi-3 site, whose attributed date is even earlier than that proposed for the *Homo habilis* fossils. Until this moment, it was thought that the first stone tools were those from Oldowai, dated to 2.6 Ma.

J. E. Lewis and S. Harmand (2016) set out what they see as the implications of the Lomekwi-3 discovery regarding the creators of those artefacts: the requirement *for complex mental skills* in the artisans, such as *comprehension* of the fracture mechanics of the raw materials and choosing *preferred* sizes and shapes of the original blocks; sensory-motor *control* when applying force and precision in movements to remove the flakes; visual-spatial *comprehension* of locations and angles for striking, to make the best use of the core; *criteria for selection* of flakes according to their intended use. There is no doubt that the development of the use of tools in the genus *Homo* was unlike any other branch of animal evolution.

These stone artefacts were not found associated with bone remains. Species with similar antiquity that are known to have lived in the region in this period are *Australopithecus afarensis* with a cranial capacity of 380 to 450 cm^3, *A. deyiremeda*, and *Kenianthropus platiops*, all from the *Homo* family.

If the framework for deliberation is *culture*, thinking only of technical creativity with stone can be an obstacle or source of confusion, a prejudice.

It seems reasonable to view the early cutting sites as places where *teaching* of skills was practised and there was *motivation to learn them*. In short, processes that imply recognition of states in the mind of the other and motivation for planning help. The indications of the mental functions needed for teaching in the artisanal workshop must plausibly have evolved in certain hominid groups *before* the appearance of the culture of stone, while they practised cultures of gathering and exploiting vital resources, migrating through different territories. If processes of teaching could reasonably be used before Stone Age culture, the cultural role of the gatherer woman grows and the social fabric of chi ldcare acquires epistemic prominence.

3. *Culture* has feminine gender, even though this was not counted in the stories

G. Hinojo, a renowned Latinist from Salamanca explains that the two major paths for inventing words are: *onomatopoeia* (from the Greek for *making names*) — a term that indicates with precision the process of invention — and *metaphor*, understanding one thing in the

terms of another (Hinojo, 2012). Metaphor is not just a poetic tool; it is an essential instrument for creating vocabulary and even for thought itself. Richter (1763-1825) went so far as to say that most of the expressions in a language are *faded metaphors*, and that *dead metaphors* remain hidden in many words.

3.1. Cicero coined the word *culture*

It is well known that the word culture derives from the participial form of the verb "*colo-colere-cultum*", whose meaning centred on "inhabiting" and "cultivating" the fields, the two most common actions among the rural village population. So, the root word recalls times of villages and peasant life, the birth of *agriculture*. Rodríguez López has shown that in ancient Rome, excellence in the way of life was "inextricably linked to the cultivation of the land" (Rodríguez López, 2002, p. 185). In the *officium* of the farmer, *vir bonus* included moral health and technical skill, but the protagonist of the story was the man. Senators and generals cultivated the earth with their hands; Cicero recommended farming as beneficial for the old and compatible with the life of a scholar (sage). In chapter XVII of *On Old Age* (Cicero, 2005), for example, he notes that Marcus Valerius Corvus was Consul six times over a period of 46 years and cultivated his land until the age of 100.

When Cato the Elder (234–149 BC) wrote the treatise *On Agriculture* (also known as *De Agri Cultura*) (Cato, 2012), the domain of *rebus rusticis*, the things of the fields, included the whole of the rural economy and peasant life (González Marrero & Ríos Longares, 2014). Even so, the space that Latin literature from this time generally dedicates to consideration of farm workers is limited. On this point, Cicero was an exception. The *tomb garden* confirmed the value attributed to the cultivation of the land (Rodríguez López, 2008).

3.2. The first and only Latin metaphorical transfer of agricultural *cultivation* to the culture of the spirit

Culture is a word (Doval, 1979) that derives from what Columella (4-70 BC) called *rural affairs* (Columella, 1988), *Re Rustica* and *Liber de Arboribus*. In the *Tusculan Disputations*, Cicero was the first, and perhaps only, person to transfer it metaphorically to refer to spiritual labours. This seems to be the first and probably only time that the word culture *was used metaphorically* in ancient Rome (Sobrevilla, 1998a). The term culture appears in *Book II, ch. 13* referring to cooperative work on the mind. Here is the complete quote:

> [...] it is not every mind which has been properly cultivated that produces fruit; and, to go on with the comparison, as a field, although it may be naturally fruitful, cannot produce a crop without dressing, so neither can the mind without education [*sine doctrina animus*]; such is the weakness of either without the other. Whereas philosophy is the culture of the mind [*Cultura autem animi philosophia est*] (Cicero, 2005, p. 69).

The paragraph contains two statements. One is the famous and oft-repeated claim that philosophy is *culture of the mind*. The second, is no less categorical: the soul *without education* ("sine doctri-

na") ceases to produce; this is mentioned less. Between them, these two expressions exalt philosophical thought — the content that keeps the mind healthy and cured — and *teaching*, the intersubjective help that feeds minds, which, with the emergence of writing, is the paradigm of school teaching[2] and, much earlier, child rearing.

In the metaphors of Cicero, from our perspective, we note: (i) an implied *ontological framework* in which the human mind can be cultivated, improved, like farmland because it possesses a fertile plasticity; and (ii) an *epistemic framework*, which is also insinuated for this cultivation, which is an intersubjective relationship of teaching, *doctrine* as well, undoubtedly, *education*[3]. Terms directly referring to *child rearing*, to care in childhood. Saint Thomas Aquinas seems to have been the first to submit the concept to semantic analysis, attributing this function to the father.

Philosophy and philosophers, "the knowledge of things human and divine" (Prologue to Book II De Officiis) (Cicero, 2014, p.167) were present when the word culture was first given meaning, and it did not include raising children, nor were women and teachers in its setting.

Cicero presents an agricultural setting within an idyllic perception. The farm setting offered values for building a "model" for an essentially urban way of life, not for the illiterate peasants themselves but for the bourgeois, maintaining the aesthetic appreciation of working in the fields. The agricultural reference contributes to the reflection on the *paideia-humanitas* a cognitive framework with an emotional nature; this framework feeds the imagination to compose a conceptual system of culture as a sort of distinguishing work on minds.

The ontological and epistemic assumption we highlight here is a clear anthropological statement: the singularity of human beings lies in the fact that they need culture to live. The minds of human beings can be developed through culture. Learning from others, teaching is *like* cultivation of the mind, lessons *are like* working the fields of the mind. Whether this was a metaphor or an accepted meaning of the word culture, the expression was forgotten (Andrés-Gallego, 2006).

3.3. The imaginary package that was transferred was incomplete, women, child rearing, teachers, and basic skills were missing

Many things were hidden in the story. It turned out to be a metaphorical transference mutilated by what was omitted from its focus. The *domestic work* of raising children was missing along with its most important figures: mothers, grandmothers, "alloparental" carers (González Echeverría et al., 2020). In *Homo* species, cooperative child rearing is a bio-ethological identifying feature (Mateos, 2014).

The particular meaning given to the word culture when it comes into being leaves almost no space for women, despite their real participation in agricultural work; this silence about rural women continues to the present day. Literary production in classical Athens or in republican Rome was dazzling, but accounts of

women's participation were minimal in comparison with works on actions by men (Vera & Ribera, 1999). In the hundreds of pages Cicero devotes to agricultural activities, women are not mentioned once. The representation of this way of life is partial, and it is categorised as *uirilia officia* (men's work), making real female participation invisible and silencing any valuation of domestic work (Cañizar, 2012), privileging only reproductive value as an economic contribution (Rubiera, 2010). In the end, child rearing and teaching of basic skills (Molas, 2002) also fell through the same gap, hence the urgency of Pomeroy's question of what women were doing while men did the things that have fascinated classical scholars (Pomeroy, 1999).

The modern meaning of culture is described in a plethora of books. The *Enciclopedia Iberoamericana de Filosofía* dedicates a volume to the *Filosofía de la cultura* (philosophy of culture) (Sobrevilla, 1998b) and another to the *Filosofía de la Educación* (philosophy of education) (Hoyos Vázquez, 2008). Sobrevilla (1938–2014) opens his volume with a chapter that is rich in information. He attributes the "modern concept of culture" to the German jurist S. von Pufendorf (1632–1694), who uses the expression *cultura animae* to refer to all of the knowledge that enables us to transcend nature, and *cultura vitae* to "caring for every human being" (Pufendorf, 1989). Von Pufendorf contrasts the concept of "culture" with that of the *status naturalis*, assimilated to barbarism. He includes in the category of "culture" everything that is not provided for us by nature: on the one hand what we find and discover and on the other what we build and make. All of the activities that our initiative generates, including the care and cooperation we receive from other humans. Sobrevilla, like many other authors, regards the proposal of an objective meaning of culture – namely all of the creations and achievements of humankind – as one of the strengths of the Enlightenment, (Sobrevilla, 1998b).

Today, specialists in paleoanthropology and primatology link the meaning of "culture" to that of "cooperation". The concept of culture is not so much rooted in the productive activity of the artisan, the "axemakers" to many people (Burke & Ornstein, 2001), but rather teaching practices. The first human beings were not so much *Homo faber* as *Homo docens*.

J. Mosterín (1941-) dedicates an extensive book to human culture. In the prologue he states that "culture is information" and, at the start of the first chapter: "There is no life without information nor is there human life without culture". He then goes on to clarify that "human culture is a special type of culture" with extraordinary power (Mosterín, 2009, p. 45).

4. New chapters in the anthropology of education

D. Lestel, in a well-documented book, echoes many observations on the close relationships between chimpanzee mothers and their young and the mothers' mediation in learning. "The behaviour of the young is modelled through the signs that the mother directs at it, and to which it gradually learns to respond" (Lestel, 2003, p. 111).

These signs can be complex and multi-modal, and the child gradually learns the appropriate response. This learning involves making responses pertinent. The mother's gaze is an important element in her decision making. There has been increased observation of transmitted behaviour mediated by non-verbal communication between great apes with the mother as the preferred partner in the cultural relationship. A summary of the results of this body of research was published in *Nature* (Whiten et al., 1999).

S. Blaffer Hrdy (1946-), one of the best known researchers in the behaviour of female primates, regards empathy as key in human evolution (Hrdy, 2016). The word *empathy* refers to the capacity for awareness of others' states of emotion or intent (García-Carrasco, 2015).

> The way our bodies — including voice, mood, posture, etc. — are influenced by the bodies that surround us is one of the mysteries of human existence, but it provides the glue that keeps whole societies together (Waal, 2011, p. 91).

In 2016 a surprising emotional exchange happened: a "last embrace" between Mama, a dying chimpanzee, and Jan Van Hoff (1936-), a primatologist from Utrecht who had been her carer for many years. F. Waal reflects at length on the incident in *Mama's last hug*: a moving embrace of recognition. Normally nobody would dare enter the den of an adult chimpanzee (Waal, 2018, p. 25).

This paragraph briefly refers to surprising features of the primate cultural world that may have been present in the moments of the emergence of human culture.

4.1. The act of teaching might have been at the origin of human culture

Within the behavioural panorama of living beings, primates display *advanced sociability* in the sense of *highly personalised social relations*. This category of relations has been "a decisive context for the evolution of intelligence, at least in the psychological functions that are most directly involved in processing information" (Colmenares, 2002, p. 271). We would also add that this is the case with the evolution of affectivity and emotions (Waal, 2016), in other words, the evolution of the system of evaluating and assessing situations.

A K. Imanishi (1902–1992)[4] confirmed two of his ideas through observation of macaques. The first was that when a monkey grows up without the care of a mother, it does not acquire the normal behaviour of its community; not being sheltered and cared for by her leaves it behaviourally diminished and impaired. Hence Imanishi's second idea, which we could call the cultural efficiency of the mother and the vital need for her help to achieve the development of her offspring's ethogram.

The females invest considerably more time and energy than the males in sustaining the social structure. If anthropologists associate the importance of group life with learning and transmitting useful information and culture, the contribution of care in child rearing, where providing information is the permanent sustenance of learning, should be foregrounded.

In this context, the underlying fact is that the survival of the species depended

on the success of the child rearing care, assistance for the vulnerable children. In this circumstance, intelligence means the capacity for empathy, which the mother experiences as real interdependence.

Nonetheless, M. Tomasello believes that chimpanzees lack true representation of the emotional state and/or intentions of the other. He argues that they behave as though they were "autistic" as they do not have a theory of mind (Tomasello et al., 1993). Tomasello (2007), proposes the obscure abstraction of a process of *individual conventionalisation*. Other authors attribute to it a will for emotionally sustained *social anchoring* to copy the adult, as De Waal (2002) states. This is why they tolerate failure for so long in their attempts; they persist without an immediate connection with the reward. Riba Cano has done an interesting review of cognitive mechanisms in the social learning of chimpanzees (2016).

5. It is very probable that the first teaching was done by a female–mother and the first student was her offspring

It has been known for some time that chimpanzees in the Taï National Park (Côte d'Ivoire) have been observed breaking nuts by using an anvil stone and a hammer stone (Luncz et al., 2018) that they found far from the tree where they found the *Coula edulis* nuts. D. Lestel notes all of the interpretations and adds something surprising: "mothers who teach" (Boesch & Boesch, 1990) have been observed on at least two occasions, with two "undeniable" cases of teaching seen in the 1980s (Lestel, 2003).

The first case was documented in the Washoe Project, which was started in 1969 by the Gardners, a married couple (Fouts et al., 1986); in around month 51 of the project, a chimpanzee called Washoe was using 132 signs from the Ameslan language for deaf people. Between 1972 and 1976 the Gardners acquired another four chimpanzees, including Loulis, who gave his name to another experiment. The aim here was to demonstrate that a chimpanzee could acquire sign language without human tutoring through simple exposure and immersion in a context of communication with its adoptive mother, chimpanzee to chimpanzee (Fouts et al., 1978). At the age of 36 months it was already using 28 different signs and had learnt other skills from Washoe. Fouts and his team reported that they had observed a possible tutoring practice from Washoe. Researchers reported that these chimpanzees were undoubtedly using signs to converse with each other.

The *second case* of teaching was reported by C. Boesch (1951-) from the Max Planck Institute for Evolutionary Anthropology in Leipzig. His team rigorously documented a chimpanzee mother showing her child how to break nuts (Boesch et al., 2017). This was also observed in captive chimpanzees by Japanese primatologists in 1985 (Sumita et al., 1985).

Lestel concludes from the review of research that chimpanzee mothers from Taï clearly show that they observe the behaviour of their young and that they intervene in their activities. They display the ability to compare the clumsy behaviour of the young with the pattern they possess for

the activity. They repeat their intervention every few minutes putting the nut back on the anvil stone so that the juvenile repeats the operation. This "active teaching" is uncommon. These were the first observations and the only ones until 2003. The author deduces from the reports that,

> […] female chimpanzees from Taï practice six helping techniques that are found in human teaching: *recrutement* (the model attracts the youngster's attention to a task), *échafaudage* (the model simplifies the task by reducing the number of actions required to achieve the solution), *maintenance* of direction (the model maintains the interest of the youngster in searching for the solution), *marquage des caractéristiques critiques* (the model accentuates certain characteristics of the task), *contrôle de la frustration* (the model facilitates the search for the solution), *démonstration* (the model provides the youngster with information on how to do the action) (Lestel, 2003, p. 157).

Lestel also believes that it is interesting that while the young try a variety of methods for opening nuts, these are always taken from the range observed in the models. For example, they never try by stamping or using their teeth.

The conclusion we believe is most reasonable is that the culture of the anthropomorphic apes and human culture have a shared evolutionary history. Human evolution must have very early on explored a distinctive and particular ecological niche, that of social situations of teaching, which mothers in particular practised with their children during the period of dependency and care of their rearing. Our hypothesis is that this might have taken place after the split from the chimpanzees (around 7 Ma) and before the appearance of the stone culture (around 3.6 Ma). In this period hominids were obliged to migrate, explore, identify new sources of food. Being able to share experiences would be of great benefit.

In this empathetic framework, which was corporeally marked and included emotional signalling, teaching might have emerged and evolved. This enquiry is currently being carried out by various teams of scientists from prestigious universities, confirming that culture transformed our species by favouring specific mechanisms for cultural transmission (Boyd, 2018).

Chimpanzee mothers' care, assistance, and dedication to their young are based on affectivity, on emotionally sustained links. If caring for the young is excluded from a social system of animal cooperation, this social system will collapse. The whole social system is seemingly built to *maintain itself*, which is the same as saying to *reproduce itself*, *construct itself*, and also *repair itself*.

The emotional link lies at the root of the actor who feels stimulated by and *compassionate* towards the incompetence and failure of the learner; the emotional state, *empathy*, activates the simulation and gives value to the decision to show and/or communicate in this scenario. This point is absent from the approach of many authors who present the narrative of the evolutionary process as solely a process of cognitive change, when it is actually emotionally loaded (Tomasello, 2019).

J. L. Arsuaga (2019) notes that "the first of us" with no doubts about their filiation are Australopithecus, who inhabited much of Africa between just over 4 Ma and just under 2 Ma. The most famous Australopithecus remains are Lucy, 40% of a skeleton discovered in Ethiopia by D. Johanson (1943–) in 1974, catalogued as Al 288-1, from the species *Australopithecus afarensis*; Lucy is a female of around 3.2-3.5 Ma antiquity, 1.10 m in height, around 27 kg in weight and is estimated to have been around 20 years old when she died based on the development of her teeth (Johanson & Edey, 1993). Today we also have 94% of a skeleton called *Little Foot*, also female, of 1.30m in height and 3.67 Ma old, attributed to the same species, discovered by D. Clark in 1994 in the Sterkfortein cave, Johannesburg. These individuals lived in an environment of patchy woodland, while chimpanzees and gorillas stayed in the jungle. The biped posture is fully realised in Australopithecus and their hands are "basically like ours" with a great capacity for manipulation according to Arsuaga. These Australopithecus skeletons show that bipedal posture and manual dexterity both developed before the increase in size of the brain. They have a brain that is almost that of a chimpanzee while their bodies have a virtually human morphology.

It is important to note that the process of evolution from the appearance of upright walking until the first stone industry, took some four million years, as stated above. There must have been fundamental *pragmatic innovations* in this period, among them, cooperative teaching practices that happened without the mediation of language.

Those hominids perfected non-verbal communication. There are more than 200 species of primate, but only human eyes have a white sclera that leaves no doubt about where or at whom one is looking. In children, the direction of the gaze tells the mother about the position of the focus of attention. In 1998, C. Boesch and M. Tomasello published an article in which they argued that culture was present in many species but that in the genus *Homo* it acquired qualitative innovations, including language (Boesch & Tomasello, 1998). Language exponentially *increased* the efficiency of cultural transmission and made possible the cumulative development of culture. It acted as an efficient mechanism for transmission – a qualitative leap in the teaching process – and the appearance of a cumulative system of cultural experiences that facilitated cultural evolution, through what Boesch and Tomasello called the "ratchet effect" (1998).

6. Conclusion: *Homo docens* as a point of view or perspective

In 1972, J. Repusseau, a French inspector of schools, published a book about the training of primary school teachers. In the title he used the expression "*Homo docens*". It seems that the first person to use this expression with an anthropological meaning was S. Barnett (1915-2003) (1973); prior to this, he had argued that there was a bio-ethological innovation in the human evolutionary line, which he described as "The Instinct to Teach" (Barnett, 1968).

Finally, in 1994 he suggested changing the name *H. sapiens*, which Linnaeus had introduced, and renaming the species as *Homo docens* (Barnett, 1994). P. Gärdenfors asked in 2003 how *Homo* became *sapiens*, (Gärdenfors, 2006) and with Högberg he published an article in 2017 examining the archaeology of teaching and the evolution of *Homo docens* (Gärdenfors & Högberg, 2017). P. Gärdenfors develops this idea by suggesting the hypothesis that the practice of teaching may well have contributed to the emergence of language (2017).

S. Dehaene (1965-) is a neuroscientist whose research is very much focussed on the school scenario of learning (Dehaene, 2019). Since 1989 he has been director of the INSERM 562, Cognitive Neuroimaging Unit, which has a large team of researchers and important scientific output. In 2014 he was awarded The Brain Prize, along with G. Rizzolatti (mirror neurons), and T. Robins. He is currently head of France's Conseil Scientifique de l'Éducation Nacional.

On 07 February 2016 he was interviewed in the Argentine newspaper *Clarín* (Martyniuk, 2016). The headline highlighted a phrase of his: "Education is a much more potent force than genetics". So, education can, with some damage, reorganise the neuronal circuits that may have come genetically, from birth.

He emphasises the fact that the existence of synaptic plasticity is not sufficient to explain our species' eco-biological success as this plasticity is present in all of the animal kingdom. S. Dehaene deduces that our mental peculiarities do not depend solely or directly on neuronal plasticity, even if it is undoubtedly one of the foundations of them. "If we have become *Homo docens*, […] it is because the brain has a variety of additional tricks" (Dehaene, 2019, p. 201).

What defines the new ecological niche of *Homo docens* is the social context of *teaching and learning* with the potential capacity that development provides for increasing functional levels. This is equivalent to stating that the radical competence, which the human condition displays, is the capacity to teach rather than the skill of the artisan. "[…] inclusion of the social medium is necessary when considering the crucial question of cognitive change" (Newman et al., 1998, p. 23).

The foremost social setting for the cognitive change would be the context of teaching. *Homo docens* introduces the possibility that the foundational novelty of humankind was teaching. Before the genus *Homo*, this had never happened in the history of living beings. The activity of teaching requires higher-level mental functions, higher than imitation. Teaching presents a dual route for understanding: one path that goes from the learner to the intentions of the teacher as model and one that comes from the teacher to comprehend the circumstance of the learner. We propose that *the capacity and competence for teaching is undoubtedly something that sets apart the talent of the brains of the various Homo species.*

It is a talent for making another person's *hidden potential* flourish. This was

the case of women such as Helen Keller (1880-1968), who was deafblind from the age of nineteen months (Keller, 2019), and Marie Heurtin (1885-1921), who was deafblind from birth. Both of these women unleashed the potential of their minds through interaction with two other women who dedicated their skills to *teaching them*. Their *teachers* had to work out a means of communication and a code. Keller had Anne Sullivan (1866-1936) as her tutor. Sullivan had learnt a tactile alphabet with which she taught Keller to read and write, and even to speak by identifying sounds in the throat by touch. Heurtin found a guide in Sister Sainte Marie-Marguerite, of the nuns of the Daughters of Wisdom, at the Notre Dame de Larnay school, near Poitiers.

Dennett calls human beings *Gregorian creatures* after the British psychologist R. Gregory (1923-2010), arguing that they are creatures who can benefit from the *potential intelligence of instruments*, as Gregory regarded words as mental tools. Gregorian creatures:

> take a big step towards a human level of mental adroitness, benefiting from the experience of others by exploiting the wisdom embodied in the mind tools that these others have invented, improved and transmitted. (Dennett, 1996, p. 101)

So many words to say that Gregorian creatures can teach and that, when they learn to do something, they also learn how to teach it! These competences undoubtedly underwent a leap in quality with the emergence of language. However, there is an increasing number of arguments that confirm that the practice of teaching pre-dates linguistic communication. Language itself might well have appeared in the context fostered and stimulated by teaching practices. We may be mistaken, but it seems that teaching emerged before the appearance of language, and we are convinced that both competences — teaching and communication — played a decisive part in the evolution of hominids.

Notes

[1] *Homo faber* was an expression coined by the Roman Appius Claudius Caecus (340–273 BC): *Homo faber suae quisque fortunae* (maker of his own luck); a term H. Bergson used in his work *Creative Evolution*, as did Marx in *Capital*... and it was used in the title of a novel: Frish, M. (1957/2011). *Homo faber*. Barcelona, Seix Barral. Sennett, R. (1997/2009). *The Craftsman*. Anagrama.

[2] "The truth is that normal practice in this period was the use of *doctrina*, to refer to educational content, and of *institutio* and *instructio* for the act of educating. *Doctrina*, deriving from the verb *doceo*=to teach (causative of *disco*=to learn, which in turn comes from **di-de-se-o*, composed from the Indo·European root **dek·*=to be good, be fitting, from which the simple defective decet is preserved. *Doctrina* refers to cultural content that is worthy of conservation, that is good). For its part, *institutio* comes from *in-stituo* and this from *in-statuo*, derived through the suffix – first person singular – of **stii/sta·* =to be standing, support oneself; it refers to staying ahead of, pulling, taking from one state to another, to hetero·learning, but based on what the subject contributes of itself" (Doval, 1979, p. 119).

[3] For Doval Salgado there is no doubt. Education derives from the verb *educare*, which in turn has its origin through derivation and composition in the basic verb *dücere*. The first appearance of the term seems to be in the Rhetoric for Herennius, which for a long time was attributed to Cicero but is by an unknown author.

[4] Imanishi founded the Primate Research Institute in Kyoto. Matsuzawa, T. and McGrew, W. (2008). Kinji Imanishi and 60 years of Japanese primatology. *Current Biology*, 18(14), 587·R591. Imanishi, K. (2011). *Le Monde des êtres vivants: Une théorie écologique de l'évolution*. Wildproject.

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