

Anatomical Atlases as Cultural Pedagogy of Bodies and the Afterlife of Images

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ABSTRACT – Anatomical Atlases as Cultural Pedagogy of Bodies and the Afterlife of Images. Anatomical atlases, as they cast unique physical forms of the human body grounded on an objective coherence between organs and their functions, fulfil the task of maintaining, through anatomical images, a certain idea of body and of subject. Thinking corporeity as a composition of biological and cultural forces, the forms whereby it is presented do not coincide with the biological body or its structuring order, but rather they constitutes an open map, connecting lines that move in the immanence of vital processes. We aim to present, in this text, the atlases as cultural pedagogy, given that, nowadays, all artefacts simultaneously become pedagogical and cultural.

Keywords: Anatomical Atlas. Medical Images. Cultural Pedagogies. Cultural Studies in Education.

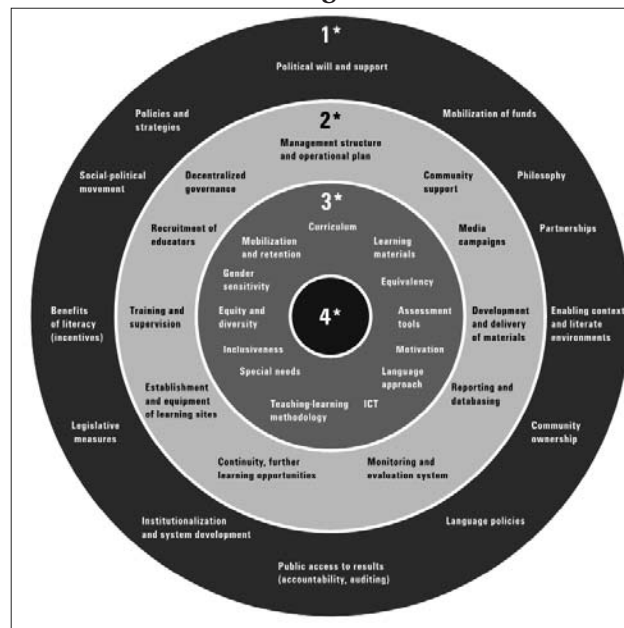
RESUMO – Os Atlas Anatômicos como Pedagogia Cultural e o Pós-Vida das Imagens. Os atlas anatômicos, ao forjarem formas físicas únicas do corpo humano, partindo de uma coerência objetiva entre os órgãos e suas funções, cumprem a tarefa de manter, via imagens anatômicas, certa ideia de corpo e de sujeito. Ao pensarmos a corporeidade como composição de forças biológicas e culturais, as formas por meio das quais ela é apresentada não coincidem com o corpo biológico nem com sua ordem estruturante, mas, antes, constituem-se como um mapa em aberto, conectando linhas que se movem na imanência dos processos vitais. Objetivamos apresentar, neste texto, tais atlas como pedagogia cultural, dado que, no contexto atual, todos os artefatos tornam-se pedagógicos, ao mesmo tempo em que são culturais.

Palavras-chave: Atlas Anatômico. Imagens Médicas. Pedagogias Culturais. Estudos Culturais em Educação.

Prolegomena

One image, Figure 1, caught my eye in the first of a series of publications by Unesco's Institute for Lifelong Learning – UIL¹, titled *The Evolution and Impact of Literacy Campaigns and Programmes 2000-2014*. Its elaboration was under the responsibility of Ulrike Hanemann (2015), commissioned by scholars linked to the Education for All – EFA.

Figure 1 – Framework Towards Successful Literacy Campaigns and Programmes



Source: Hanemann (2015, p. 14).

The figure refers chiefly to large scale adult literacy campaigns, but it nevertheless highlights the increasingly blown up protagonist of contemporary education, the learner, who is placed at the centre of the circle, inside three spheres. The first sphere: Teaching and Learning Process (Curriculum; Learning Material; Equivalence; Assessment tools; Motivation; Language Approach; ICT; Teaching-learning methodology; Special needs; Inclusiveness; Equity and diversity; Gender sensitivity; Mobilisation and retention); The second sphere: Supporting Structures (Management Structure and operational plan; Community support; Media campaigns; Development and delivery of materials; Reporting and databasing; Monitoring and evaluation system; Continuity, further learning opportunities, Establishment and equipment of learning sites; Training and supervision; Recruitment of educators; Decentralised governance). The third sphere: Enabling Environment [i.e., the contexts that may facilitate the carrying out of the previous spheres]; (Political will and support; Mobilisation of funds; Philosophy;

Partnerships; Enabling context and literate environments; Community ownership; Language Policies; Public access to results (accountability, auditing); Institutionalisation and system development; Legislative measures; Benefits of literacy (incentives); Social and political movement; Policies and strategies).

In Figure 1, Teacher and teaching are replaced by wider cultural pedagogies. Additionally, the figure makes clear another aspect of educational processes in the neoliberal context, a *modus operandi* that Carlos Ernesto Noguera-Ramírez (2011) called the “learning society”, whose driving force resides in the very concept of learning.

This is a new concept, of Anglo-Saxon origin (in its meaning), intimately associated with the developments in biology and in the evolutionist theories of the nineteenth-century. Its importance in the development of thought and pedagogical practices in the course of the last century can be perceived in the growth and the expansion of the so-called learning psychologies, in developments in the field of curriculums, in the worldwide diffusion of ‘institutional technology’ and of ‘educational technology’ in the 1960’s and 1970’s, in the productions around ‘lifelong learning’, ‘learning society’, the ‘permanent apprentice’ of the 1990’s and also up until the more recent elaboration and discussions, around the ‘approach by competences’ or ‘education by competences’ (Noguera-Ramírez, 2011, p. 230).

Noguera-Ramírez (2011) refers to three publications in order to advocate for the passage from instruction or teaching onto learning: the book *The Post-Capitalist Society* (1993), by Peter Drucker, deemed the “father of modern management”; a report presented to UNESCO (United Nations Organisation for Education, Science and Culture) in 1996, and that had been elaborated by the International Commission for Twenty-first-century Education, at the time presided by Jacques Delors; and, finally, a 1973 publication, carried out by the International Commission for the Development of Education, linked to UNESCO and presided by Edgar Fauré.

Grounded on these three documents, Noguera-Ramírez (2011, p. 15) highlights the break that has taken place in discursive order, from the mid-twentieth-century onwards. There was a passage “[...] from an ‘Educating State’, or from an organising form in which education, better said, ‘public instruction’, was responsibility of the State, it was a State function carried out through public school”, onto another form of education, which will summon the whole of society. If up to the end of the nineteenth-century we had instruction and teaching centred around the Educating State, around the Public School and around the teacher, in the present day such configuration has changed, and now each individual is responsible for his or her own learning process.

Danilo Martuccelli, as he wrote about the new social dominance mechanisms in the contemporary world, also highlights the taking up

of responsibilities by the individual. In this sense, the nucleus of this operational mode consists in attributing to each subject the lifelong responsibility “[...] not only for what one does (and that defines, as always, the very notion of responsibility), but also persuading one to take up being the cause of the totality of things that befall him or her (the principle of making responsible)” (Martuccelli, 2007, p. 53). This attribution of responsibility, the author underlines, demands from the individual “a permanent implication [...] in all levels of social life” (Martuccelli, 2007, p. 53), and part of this is the learning process.

Regarding, specifically, charging the individual with one’s own learning, Noguera-Ramírez (2011, p. 16) highlights “the imposing a proper name for this new form of social organisation: the ‘educating city’”, which coincides with the maximum concentration of people living in urban environments, whose inhabitants are his “permanent apprentices”, “lifelong” learners, or, as the author prefers, his *Homo discens*. Therefore, if the passage from the nineteenth- to the twentieth-century was marked by the emergence of learning, it was, above all, “[...] the building, in the field of modern pedagogical knowledge, of a new concept, inexistent until then: the very concept of ‘learning’”. Worth mentioning that

This does not mean that before it was not conceived that individuals could learn. Evidently, since Comenius, for instance, one sought to teach (*docere*) everything to all, so that everyone could learn (*discere*). But one thing is to learn and have all people learn. Another is apprenticeship. One thing are the learnings that result from teaching or instruction. Another is learning as a concept relative to the capacity of living organisms to adapt to the environment, transforming it and transforming oneself at the same time (Noguera-Ramírez, 2011, p. 17).

The spreading of a wide set of educational artefacts, in their distinct visibilities³ (ways of seeing and of making see), sayabilities (ways of speaking and of making speak) and supports, has taken away from the formal spaces of education the primacy of educational work geared towards the “[...] suspension of a so-called natural unequal order” (Masschelein; Simons, 2017, p. 26) between students. Nowadays, learning cuts across all times and spaces that, in their turn, become time-space-educational, “[...] this economic form of governance that seeks to govern less in order to govern more, i.e., this form of governing whose fundament is freedom, interest, agency and self-regulation of individuals” (Noguera-Ramírez, 2011, p. 230). This self-regulation, given by making the individual responsible one’s actions and everything that happens to him or her, results in the sensation that success or failure depend exclusively on one’s choice. Therefore, each one is responsible for this permanent learning process aiming also at minimising possible failures, conceived as the individual’s fault (Martuccelli, 2007).

Learning, then, takes up “the form of pedagogical governance” (Noguera-Ramírez, 2011, p. 230), for “[...] we are compelled to behave

live permanent apprentices, who live in learning societies or in education cities” (Noguera-Ramírez, 2011, p. 230).

This learning also regards the care we have regarding ourselves, of our body and our health. Thus, medicine, in its preventive dimension, has guided us to live orderly, in balanced and healthy ways, to each one is given the responsibility for such achievement (Russo, 2006). At the same time, all excess is morally condemned, deemed as the non-obedience by individuals of the medical prescriptions that rule life, in its diverse aspects (Russo, 2006). But medical action is taken over bodies, taken in their biological dimension, the *body-object*.

In Medicine courses, students begin their learning with the dead body, a body in pieces, the body-object, the body of the anatomical atlas, which is the model of the universal body. But what they will come in contact with in future appointments are body-people”. However, in the course of their undergraduate years as medical students, “when the students enter the clinic, when they come in contact with real patients in real surgeries, they will have never met this body-object that grounded his anatomical knowledge. They meet body-people (Russo, 2006, p. 183). As Jane Russo argues in favour of the non-hierarchisation between planes (body and person, physical and mental, biological and moral), she questions why, in Medicine courses, “[...] students are presented to the human body through their anatomy books’ images, above all, through the human anatomy classes” (Russo, 2006, p. 183), a body that exists solely in that context.

I shall study in this text anatomical atlases (elaborated since the Renaissance), not only as visual artefacts, in the field of the medical, biomedical and health sciences, but as one of the most effective cultural pedagogies⁴ regarding the production of a subjective condition for the body’s objectification, grounded in the identitarian scope, increasingly ossified, despite the feeling that, nowadays, everything circulates at a vertiginous speed. However, “[...] everything seems to remain in the same place, given that the differences disappear among the states of manufactured things and in the midst of standardised spaces, where everything is interchangeable” (Guattari, 1994, p. 9). In this sense, the movement of looking at the images of an anatomical atlas, reading its correspondent legends and texts, produce an educational and intentional gesture whose effect is in its *pedagogy*, i.e., in the silent act (of browsing through its pages), which at the same time is noisy (as it provokes intensities in thought and in life), of following with the gaze and fingers through the atlases, which teach us how to think and live in a certain type of corporeity. If “all knowledge, as it was constituted as a system of signification, is cultural, and if “[...] all knowledge is closely linked to power relations” (Silva, 2017, p. 139), there are close relationships and connections between pedagogy and culture.

As with education, the other cultural instances are also pedagogical, they also feature a ‘pedagogy’, they also teach something. Both education and culture in general

are involved in transformation processes of identity and subjectivity [...]. At the same time, culture in general is seen as a pedagogy, and pedagogy is seen as a cultural form: the cultural becomes the pedagogical and pedagogy becomes cultural (Silva, 2017, p. 139).

I have divided this text in three parts, aiming to present how a subjectifying and objectified universal geography of the human body is forged – in the sense of learning being put under the full responsibility of the individual and that encompasses the human body as flat tracing, whose visibility and sayability are tributaries, in part, both of the images from anatomical atlases and of the bodies in pieces. In the first part, I describe how modern anatomy and its pedagogical device *par excellence*, the anatomical atlas, subjectify us in order to carry out a certain reading of the human body. In the second, I state that the physical organisation of the organism (carried out through organised dead matter, the corpse), used by medicine in teaching and medical practice, remains mimetic to the anatomical image. It follows from this that a truth value is attributed to the anatomical image as the only possible form of representation of a physical organism, underlining the image of the body represented in the anatomical atlases as sovereign enunciation about the development of modern anatomy. Still under this item, I discuss the permanence of the individual in the very image of the atlas that, to a certain extent, resists objectification, insinuating itself as body-person. And, finally, I discuss corporeity under the light of Deleuze's and Guattari's notion of map, close to the idea of image as excavation, and, in the wake of Didi-Huberman, as an endless gesture in dealing with images, which, routinely, summon us to regard them as total and universal images, but that need to be exhausted at each fresh imagistic excavation.

De humani corporis fabrica libri septem and Atlas der descriptiven Anatomie des Menschen: between a society of teaching and a society of learning and of making responsible

De humani corporis fabrica libri septem ("About the constitution of the human body in seven books) was published in 1543⁵, and the first edition of the *Atlas der descriptiven Anatomie des Menschen* in 1904; 361 years separate the authors: Belgian physician Andreas Vesalius⁶ (1514-1564) and German doctor Johannes Sobotta (1869-1945), respectively. *De humani corporis fabrica*, as it brings together textual and visual languages to reveal the inside of human anatomy, has instituted the medical *modus faciendi* of contemporary anatomical atlases such as Johannes Sobotta's. The latter publication, in its twenty-fourth edition, remains one of the publications most employed by professionals of the various knowledge areas within the field of Health. It has been published in Arabic, Chinese, Korean, Croatian, Spanish, French, Greek, Dutch, Hungarian, Indonesian, English, Italian, Japanese, Polish and Turkish. Furthermore, in *De humani corporis fabrica* "that which

is shown is not only an anatomy; it is also a new and serene stance of a Man who becomes aware of himself, at the centre of a geography to his scale” (Sicard, 2006, p. 53-54).

Two aspects stand out regarding Vesalius and Sobotta. First: the anatomical atlases, constituted by texts and images of diverse natures and scales, detail and organise the human body, not only forging the representational scope of form and content of a given body-subject, but also working as a cultural pedagogy in the subjectifying wake of a body-person who, in the images, does not disappear, but resists, imposing itself by means of its singularities of being “man or woman, young or old, fat or thin [...]” (Russo, 2006, p. 185). A body has a history, because, forged in a given culture, it is not restricted to being biological, but is also cultural/social (Russo, 2006); a body-person surviving as *pathosformel* in the anatomical atlases. The notion of the *pathosformel* is a tributary of the studies by German art historian Aby Warburg (1866-1929) who, as he studied the sculptures from Western Europe’s classical Antiquity, observed the survival of the human gestural repertoire set in stone in the form of the later paintings of Florentine Renaissance. Survival in the sense of a “post-life of forms” (Campos, 2016, p. 278). As I displace the notion of *pathosformel* to the anatomical atlases, I believe that the survival of the “content-form” of the body-person is present in the images of the anatomical atlases, i.e., there is a post-life of a given historical subject between these two atlases. The second aspect, related to the previous one, refers to the educational contexts of the sixteenth- and twenty-first- centuries, evident in both atlases’ covers.

It is important to highlight the process that rendered possible the constitution of the anatomical knowledge that, as body and person were separated, allowed dissection. With the beginning of official dissections in the fifteenth-century, the practice would only become trivial in Europe between the sixteenth- and seventeenth-centuries, causing a fundamental ontological mutation in the meaning of knowledge, given by the separation between body and person (Le Breton, 2011). During the whole of the Middle Ages, dissection was unthinkable. Body and people were inseparable. To defile the body was to defile the human being, a divine creation. But “with the anatomists and, above all, from Vesalius’ *De corporis humani fabrica libri septem*, an implicit distinction is born in Western episteme between Man and his body. The contemporary dualism thus emerges [...]” (Le Breton, 2011, p. 72), grounding modern Western medicine, which considers the isolated body, separated from the person. This dualist vision sustained/sustains the belief that we have a body and not that we are a body (Le Breton, 2006; Russo, 2006). However, when alive, even when admitted to a hospital, the body-person “resists to be transformed into a body-object” (Russo, 2006, p. 185). Likewise, in the Atlas, the dead body, as we shall see below, brings implied the body and a post-life of forms (Campos, 2016).

I will now consider the first aspect mentioned above, regarding survival and resistance of a form of body-subject in the images of the anatomical books, also in these atlases, paying attention, for a few mo-

ments, to Figures 2 and 4, respectively the covers of Vesalius' and Sobotta's atlases.

Figure 2 – Frontispiece of *De humani corporis fabrica libri septem*



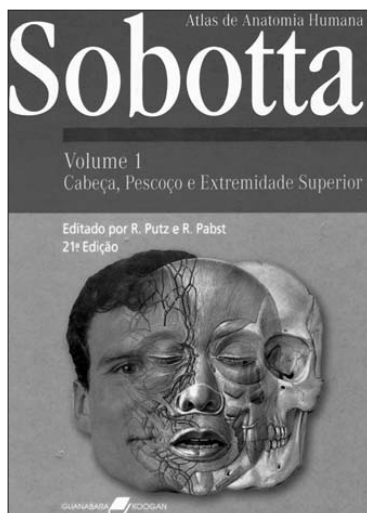
Source: Vesalius (1543).

Figure 3 – Vesalius, *Humani corporis fabrica*, 1543



Source: Vesalius (1543, p. 174).

Figure 4 – Cover of the Human Anatomy Atlas



Source: Sobotta (2000).

The frontispiece of figure 2, set in an amphitheatre, regards the public autopsy of a woman, to whom

[...] all gazes of an indescribable crowd converge: a hundred doctors, students, notables or mere curious onlookers, extend their necks and widen their eyes. The herb tuft in the cornice invites the presumption that the scene develops outdoors. At the centre, lying on a piece of cloth, is the body. Next to the cadaver, the master: Andreas Vesalius in person. A barber, not much visible, awaits, with elbows on the table, still holding a blade. Below the wooden plank that holds the corpse, partially covered, a man listens and takes notes. Only one character concentrates the functions of *magister* and *ostentor*. Andrea Vesalius, he who knows and teaches, is also he who looks and shows. His role as *explicator chirurgae* earns him admiration and respect. The proof is not the written, but the 'seen'. Knowledge is now subordinated to the verifiable (Sicard, 2006, p. 54).

The (bidimensional) woman's body at the centre of Vesalius' atlas cover shows that "[...] her exposed entrails occupy the exact spot between the title and the back of the print" (Laqueur, 2001, p. 97). A print that lets see, above all, "[...] the majestic power of science, confronting, dominating and representing the truths of the body in a consciously public theatrical way (Laqueur, 2001, p. 97). Also a statement about the power of the masculine over the feminine, regarding the knowledge of the body and control of its *nature*.

Figure 3 regards the exhibition of muscles, presented in the corpse that, in movement, permits a glimpse of the human inside the body. In such representations by Vesalius, the dead play out being alive, as if they

were not corpses, as if they were “[...] capable of personally attesting the facts presented by the anatomist and the epistemological soundness of the anatomy (Laqueur, 2001, p. 101). The expectation is to create a “reality effect”, i.e., “[...] the art and rhetoric of Renaissance anatomists proclaim the authority of vision and the power of dissection” (Laqueur, 2001, p. 102).

Regarding Figure 4, the man’s right cheek unfolds into two complementary planes: muscles, veins and nerves, bone structure. If, in Figure 2 one has the public and pedagogical aspect of autopsy, in Figure 3 the human prevails, the person, the identitarian, the social and private element of the cover image: the face. It renders evident, in the two atlases, cultural/political contexts and the subject’s different forms of being. In the wake of Norbert Elias (1989), Noguera-Ramírez (2011) identifies, between the sixteenth- and twentieth-centuries, three forms of being for the subject: *Homo docibilis* corresponding to the “moment of ‘the society of teaching’” (Noguera-Ramírez, 2011, p. 120); *Homo civilis*, related to the “Educating State” or “educating society”; and *Homo discentis*, corresponding to the “society of learning”.

These forms of the subject, in Vesalius’ and Sobotta’ atlases, are the *pathosformel* of a subject that has not disappeared in the images of the body-corpse of contemporary anatomical atlases. Although medicine subtracts the image of the human body of its subjectivity, making rational use⁷ (Le Breton, 2003) of such images, the face and the body’s stance suggesting movement allow for a glimpse of the human in the body, the *body-person* that resists.

As the dead body, objectified by medicine in the atlases, exposes the dimension of the individual, or the person in the body, it also recalls the social meanings of death itself that, like birth, keeps rituals (Van Gennep, 2011) that give meaning to these messages, updating society and its codes, in each one of the participating individuals. However, medical, anatomical-physiological knowledge, “[...] conceals the subject, one’s personal history, the intimate relationship with desire, angst or death; it neglects the relational net in which it is inserted, considering only the ‘corporal mechanism’ [...]” (Le Breton, 2011, p. 340), remaining loyal to Vesalius’ dualism.

At the same time, although guided by technical objectivity, due to the highlighting of the body’s physiology and anatomy, therefore, the biological dimension, both the atlases studied here present images and movements that express more than the physical body, referring to the subject that has embodied it, as in the smile on the man’s face, portrayed among muscles and bones in Sobotta’s atlas (Figure 3), or in the muscles presented by the individual itself, in Vesalius (Figure 4). In it, the image’s visibility “is the effect of scalping, which tears out inert pieces of tissue and compares them [...]” (Le Breton, 2011, p. 315). In Vesalius and in Sobotta, the symbolic dimension of the *body-person* resists, evading the determination of its objectification. The historical subject, who had given life to the body and who continues to give movement and express facial emotion, insinuates itself, even as it is presented, in the background, as the root for the other images where muscles and bones

are displayed, the final cause of the atlas itself. In a study about medical images and the imaginary around the body, Le Breton (2011) opens the chapter with the lines: “The images become today the pieces for the conviction of an ever more evanescent reality. The world becomes sampling (and, therefore, demonstration); it is organised, above all, in the images that they are given to sight (Le Breton, 2011, p. 309).

In this context, the signs prove to be more real than the real itself, keeping in mind that, in this perspective of the spectacle, vision becomes the main sense – to the detriment of all the others, so that the very access to knowledge, as a priority, has to pass through the way of the gaze (Le Breton, 2011). In Western episteme, the naive gaze of daily life is not sufficient, “for Descartes, it is not enough to see, but, instead, this equipped and analytical gaze that guides rational thought” (Le Breton, 2011, p. 314), especially in medicine. From Vesalius on, anatomists will explore everything that is under the skin of the body, opening it up to the gaze in the exploration for anomalies, with the aim of establishing the relationship with disease. “It is, by the way, always about death” (Le Breton, 2011, p. 315).

How to Read an Anatomical Atlas or on How to Forge a Universal Body

The term atlas is usually employed to refer to a set of maps and their identities, both cartographic and geographic. However, when displaced into the field of human anatomy, the same expression is used to designate a book where image sets of dissected bodies are presented. What is expressed in the anatomical atlas does not coincide with corporeity, but, instead, it elaborates its form, and, therefore, its content. As anatomical science started to use the name *atlas*, displaced to the field of the health sciences to name the stratification of the human body, anatomical science produced a geography, a representational time-space, thus establishing “a close relationship between the visual and scientific knowledge about the human body. As a consequence, there emerges the model of a single body, reproducible *ad infinitum*, presented as the norm for all bodies” (Ortega, 2008, p. 100). The very differentiation between sexes in this model of a single body was historically determined. “In the sixteenth-century there still was, as it had been the case in Antiquity, only a canonical body and this body was male” (Laqueur, 2001, p. 91). In the Renaissance, when the masculine and feminine representations appear, it was anchored in the “cultural policy of representation and illusion, not in evidence about the organs, canals or blood vessels” (Laqueur, 2001, p. 92).

The close relationship between images and the scientific knowledge of the human body referred to by Spanish philosopher Francisco Ortega, finds in the anatomical atlas its chief means of effectuation, but this very link results in the constitution of a single model of corporeity, whose normality principles are put in action by the wide visual content that fundamentals the anatomical atlas. The image of the organised body does not coincide with the impermanence of the bodily living matter, but nevertheless uses it, as a corpse, in order to play it out and order it

as an image model. “Anatomical knowledge celebrates the body’s autonomy and the suspension of the man that it does not, however, cease to embody (Le Breton, 2011, p. 317).

To analyse the content of the anatomical atlases as subjectifying cultural pedagogy is a way of presenting how life is designated based on the visual exteriorisation of an organism. This designation helps to establish an inanimate image of life by means of a specific arrangement of organs and functions that imprisons life instead of liberating it, because it is not the organs that hold power over life, it is life that is effected by means of the organs. The anatomical atlas silences the multiplicity of bodies that, as these don’t participate in a normality ideal (Canguilhem, 2009), erases its variations, its deviances, its *abnormalities*, which constitute the immanent force of that which is alive. Reference among professionals and students of the Health field, the human anatomy atlases have become their main books since the publication of the previously mentioned *De humani corporis fabrica libri septem* and of *Atlas der descriptiven Anatomie des Menschen*,

The anatomical atlases constitute a central artefact for the studies of human anatomy; in them, not only representations of the body are shown, but also a particular way of reading, as graphic elements are placed to guide and lead a specific visual organisation of the human body. This organisation is also applied as a methodological procedure to carry out the practice of dissection and physical organisation of the corpse (Figure 5) to be represented graphically, seeking maximum objectivity. The anatomical system is constituted by the partition of the body into planes and axis, as well as by the organisation in layers and systems, so as to establish both a reading order for the corpse’s physical organisation in its effective dissection and the forging of a methodological-scientific discourse. Thus, medical images deepen the body-person dissociation, carrying out “[...] a sumptuous fragmentation of the body, isolating the organs, the functions, and even cells and molecules” (Le Breton, 2011, p. 317).

Figure 5 – Detail of the Dissection of Head and Neck, With Pins Indicating the Structures Studied

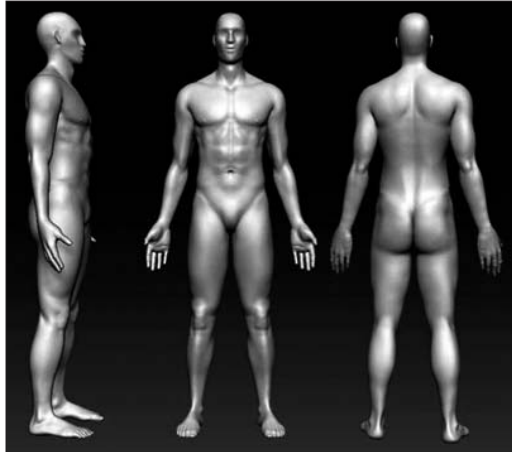


Source: Sousa (2017).

Medicine's desire to see supports the desire to know, seeking to "[...] cut across the invisible interior of the body, record its images, leaving nothing to shadow (that is, inaccessible to the gaze)" (Le Breton, 2011, p. 319). The visual content of the anatomy atlases is constituted by image sets composed by diagrams, drawings, photographs, radiographs, tomographic images, ultrasound and magnetic resonance images, distributed in a given methodological and pedagogical sequence, whose result is the presentation of the physical organisation attributed to the body. The imagistic variation of such material produces visibilities and sayabilities about the body with the aim of representing it as the bodily reality, i.e., what we usually call the reality of the body is mimetically traced, so that the organisation model thus set up in the atlas gains the statute of truth. The organisation of an anatomical atlas' content – the way in which the images, the text blocks, the schemes, the chapters ordered into systems are placed – is, therefore, an immediate expression of what the book announces: the invention of a body as matter to be pedagogically organised, situating it as a tool for the instruction and education of the body. The anatomical atlas thus duplicates the organism, be it in its visual enunciation, be it in the way a content is organised in order to establish a didactic finality to the reader and to guide the physician's action. "The medical image today is intended as a kind of 'ready-to-think' and 'ready-to-use'. In the service of diagnosis or of research, it is placed as prior to action" (Le Breton, 2011, p. 328).

How, then, to read an anatomical atlas? First, realistic images are employed, such as, nowadays, photographs and colour images in order to instruct the reader about the sections of the human male and female bodies: upper limbs (arm, forearm, hand) and lower limbs (thigh, leg, foot), head, neck, torso (thorax, abdomen, pelvis) and back. The figures are placed according to a given anatomical position with the aim of presenting anatomical structures. The representation of such anatomical positions appear as a standing body: erect torso, neck and head in line with the torso, gaze fixed in the horizon, upper limbs stretched alongside the torso, palm of the hands turned towards the viewer and parallel feet (Figure 6).

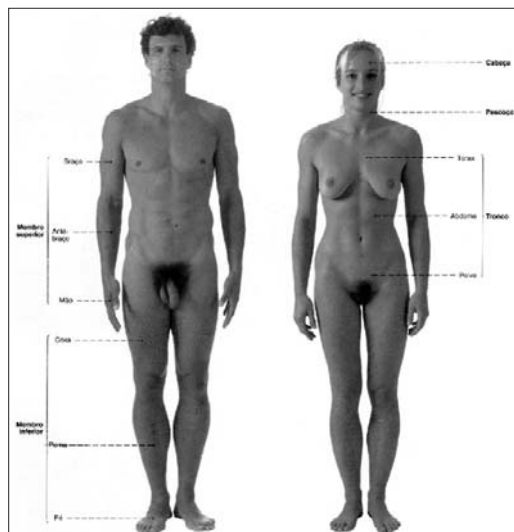
Figure 6 – Anatomical Disposition



Source: Horita (2012, p. 1).

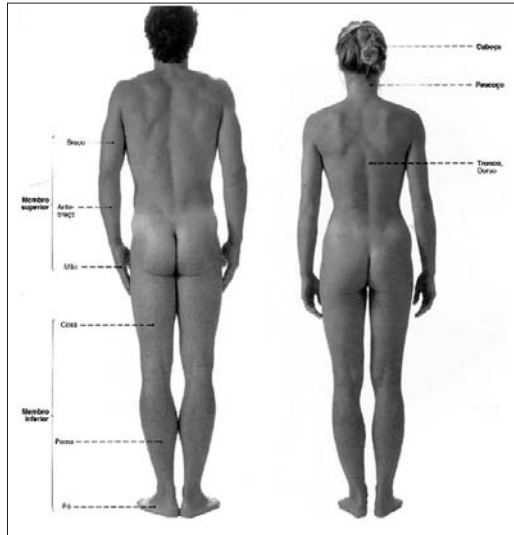
Thus the first organisation level exterior to the human body is established; such images show bodies that fit into certain normality principles (Figures 7 and 8). These are images of bodies selected by criteria of ethnicity, skin colour, weight, height, muscular tonus, gender, age, and who serve as the single model for all other bodies. All the other forms of corporeity not adjusted to this model – Black, elderly, infant, obese, slender, dwarf, transgender, amputated or cyborg bodies – are rejected, some of the inscribed as abnormal. Thus, the medical-scientific visual project of the anatomical atlases forge corporeity from a homogeneous faciality.

Figure 7 – Ventral View of Man's and Woman's Surface Anatomy



Source: Sobotta (2000, p. 2).

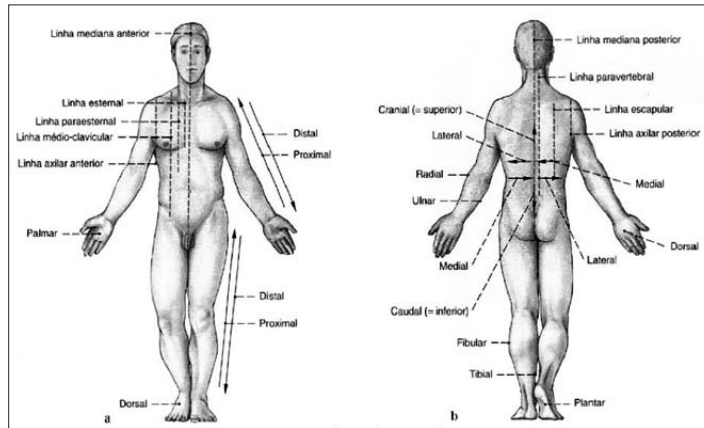
Figure 8 – Dorsal View of the Surface Anatomy of Man and Woman



Source: Sobotta (2000, p. 3).

Another form of physical organisation of the body regards spatial localisation. Anatomical science establishes terms of position and direction in order to describe the relationship between the sections of the body, as well as their relative position between these two or more structures. Such lines are used in the anatomical representation of the bodies, imposing identification and localisation coordinates aiming to guide anatomical practice and to circumscribe the bodies in a demarcated territory (Figure 9).

Figure 9 – Representation of the Lines Of Position and Direction in the Human Body



Source: Sobotta (2000, p. 1).

Note Figure subtitle

[Left]: Anterior median line / Sternal line / Parasternal line / Midclavicular line / Anterior axillary line / Palmar / Dorsal///

Distal / Proximal / Distal / Proximal

[Right]: Cranial (=superior) / Lateral / Radial / Ulnar / Medial / Caudal = inferior) / Fibular/ Tibial///

Posterior median line/ Paravertebral line/ Scapular line/ Posterior axillary line/ Medial/ Dorsal/ Lateral/ Plantar///

The terms designating bodily positions and directions are defined, in Chart 1, in the following way.

Chart 1 – Terms Used by Anatomy to Define Position and Direction of the Human Body

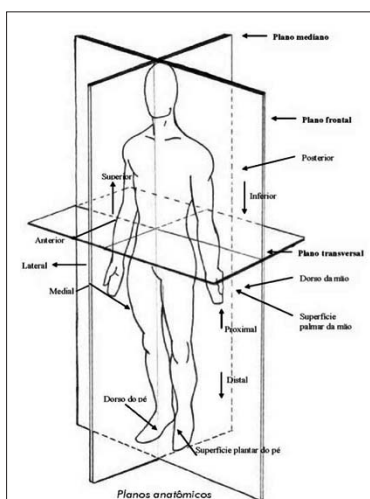
Position	Direction
Anterior (Ventral)	In front, the front of the body, closer to the front of the body.
Posterior	Behind, dorsal, in the back.
Superior	Over (supra), regarding another structure; also indicates a cephalic or cranial extremity.
Inferior	Below (infra) in relation to another structure; also indicates the caudal extremity.
Median	Situated on the median plane.
Medial	Relative to the middle or the centre, closer to the median plan than another (internal) plan.
Intermediary	Sited between the medial and the lateral
Lateral	Refers to the external side, farthest from the median plan than to another (sternum). Situated between one lateral and another medial.
Proximal	Closer to the torso or to the point of origin, or closest to root of the limb.

Cranial	Upwards, towards the cranial or cephalic extreme (superior).
Distal	Means farthest from the centre or point of origin.
Caudal	Towards the caudal extreme of the body or inferior.
Dorsal Decubitus (DD)	The body laying on its back.
Ventral Decubitus (DV)	The body laying with the anterior face turned downwards.
Lateral Decubitus (DL)	The body laying on its side.
Antero-superior	In front and above.
Antero-inferior	In front and below
Antero-lateral	In front and on the external side.
Antero-medial	In front and on the internal side.
Postero-superior	Situated behind and on the upper side (cranial).
Postero-inferior	Behind and below (caudal).
Postero-lateral	Behind and on the external side.
Postero-medial	Behind and on the internal side.
Central	Closer to the centre or towards the centre.
Peripheral	Farthest or distant from the centre.

Source: Moreira (2010).

Anatomical science also describes the organs by means of three main plane sections of the body-corpse in time-space: the sagittal, which, as it cuts across the middle of the organ, produces the right and left sides; the frontal, dividing the organism into two different halves, anterior and posterior; and, finally, the transversal, as it sections the organism horizontally into the superior and inferior parts (Figure 10).

Figure 10 – Representation of the Anatomical Planes of the Body

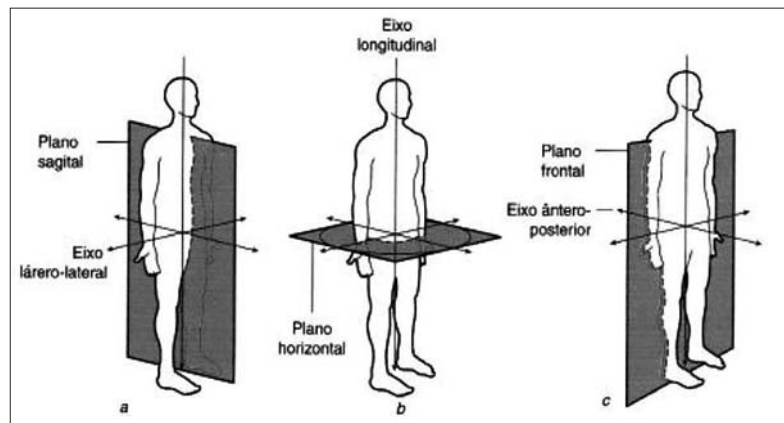


Source: Marques (2015, p. 1).

Note Figure subtitle: Anatomical planes
 Superior, Anterior, Lateral, Medial, Dorsum of foot/
 Median plan, Frontal plane, Posterior, Inferior, transversal plane, Dorsum of hand,
 Palmar surface of hand, Proximal, Distal, Foot's plantar surface/

Another orientation and organisation tool elaborated by anatomy keeps direct association with the cross-cutting planes. This tool amounts to the division of axes into imaginary lines that, as they perpendicularly cut across the planes, indicate the movements in the human body (Figure 11). Such planes and axes, applied to the body, allow for a wide degrees of displacement. The imaginary line of the latero-lateral axis move from the right side to the left of the body and vice-versa, extending from one side to the other, perpendicular to the sagital plane. This axis, also called transversal or horizontal, propitiates the movements of flexion and extension of articulations such as the shoulder and elbow. The line of the antero-posterior axis, also called sagital, cuts across the body from the anterior to the posterior direction and vice-versa, perpendicular to the frontal plane, allowing for the movements of abduction and adduction, such as the articulation of the pelvis. The line of the longitudinal axis, called cranial-caudal, crosses the body top-down and vice-versa, perpendicular to the transversal plane, allowing for movements of lateral and medial rotation similar to those of the lateral-lateral axel, for its involves the articulations of shoulders and of elbow.

Figure 11 – Imaginary lines of movement axis of the human body and section planes



Source: Behnke (2004, p. 2).

Note Pictures's subtitle

Sagittal plane, Latero-lateral axis / Longitudinal axis, Horizontal plane / Frontal plane, Antero-posterior axis.

Conceptual description and orientation tools grid out the human body for the anatomical practices of dissection and organisation of the corpse to be established. The procedures described above compose the theoretical and empirical apparatuses elaborated by anatomical science. As the procedures guide the reading and comprehension of the anatomical atlas, they serve as a practical guide for the manipulation of

“pieces” in the laboratories. The corpse is manipulated by means of a hierarchical cascade of micro-scalar stratification levels (cells, tissues, organs and systems). The means of representation elaborated and used by anatomy should not be considered as tools inferior to the practice of cutting, dissecting and organising human physiology, for the anatomical atlas works as an imagistic pedagogy as it circulates the results of studies and research, grounded on a universal and stratified image of the body. “An image that would be like a slice carved out of the world, a transposition that would be even more proper than the real of which it is a copy” (Le Breton, 2003, p. 330). The dissected corpse, or the organised dead matter, serves as illustrative space for the practical exercise of tracing.

The simulation of the body’s dissection in didactic images competes with the idea of the organisation of space present in perspective. As it transforms the act of penetration into a sequence of pages in a book, the anatomist creates a kind of mental guide. The image is a mediator of knowledge, which is structured in visual layers, crossed by the exact cutting of matter, structured into precise intervals. The hyper-real simulation images are technologies of rationalisation of the body into visual objectivity (Terra, 2007, p. 159).

If, on the one hand, the atlas captures and imposes absolute stability of physiological aspects that do not coincide with life’s impermanence, on the other, it secures scientifically formalised answers to this very impermanence. The anatomical atlas and its iconography constitute imaging technology that, as it didactically presents the human body, plays not only subjectifying roles, but also pedagogical functions, as it lays down instructions that educate the gaze and the perception of physical aspects that evade the individual’s immediate apprehension.

Anatomical discourse – grounded on its textual and visual enunciations and on control, selection, organisation and distribution procedures – promotes the distinctions between the normal and that which evades medical majority standard (Ganguilhem, 2009). If there is in the body spaces localisable by instruments, there is also a certain indetermination of this spatial dimension that cannot be traced by scanning (Santos, 2003). To make an operational totality of the body and its organs, named as organisms and, at the same time, to stratify them and to designate them by means of systems, regrouping them to find lost unity, is also a mastering exercise over life itself that, notwithstanding, exceeds itself and is differentially manifested without the cognitive tutelage of men and women.

Geographical Atlas of the Body: map creation and distribution of organs on a plane

Gilles Deleuze’s and Félix Guattari’s concept of mapping (1987) moves away from what would be a figuration/illustration of the real,

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thus aiming to affirm less the tracing and more the experimentation immanent to bodily reality:

The map is open and connectable in all of its dimensions; it is detachable, reversible, susceptible to constant modification. It can be torn, reversed, adapted to any kind of mounting, reworked by an individual, group, or social formation. It can be drawn on a wall, conceived of as a work of art, constructed as a political action or as a meditation (Deleuze; Guattari, 1987, p. 12).

However, it is possible to state that the concept of a map in Deleuze and Guattari also dovetails with the tracing-maps as they agency heterogeneous elements in their elaboration, an experimental procedure on the real that invests not only in the reproduction of forms or in the search for a specific totality, but, on the contrary, the map is also open to multiple connections. To understand the body as a fold of geographical space and vice-versa, making of the map its experimental procedure, is an artifice that approximates life to the real grounded on its bodily and spatial immanence. If, at once, Deleuze and Guattari (1987) start from an opposition between map and tracing, they escape such dualism as they state that it is proper to the map to be traced when it is done over a fold of the real.

Thus, the map and tracing compose one another, even if tracing has already translated the real into language (Deleuze; Guattari, 1987), so that only the work of exhaustion of the image-map will reinstitute to the map its immanence. In this case, the assemblage procedure, including re-assemblage and de-assemblage (Didi-Huberman, 2017), will allow to operate with maps turned into images, for the excavation work allows for the destitution of maps from their condition of total-images/universal, into a map-image-crevice: that image which summons us to excavate it in order to find in it the meaningless, the not-known, no matter how familiar it may be.

Tracing works like figuration, representing the force lines that constitute the map, but the condition for the map to exist is the permanent impossibility of it being represented, i.e., captured or translated into a structure:

An example of spatialisation that, often, is not linked to a 'map' properly speaking, is the disposition and demarcation of borders of the Krahó people's village. Spatialisation there is carried out with criteria regarding dwellings of the living and of the dead. The Krahó believe that the dead (*mekarõ*) hold an inverted view of day and night, and they frequent the village of the living during the morning (when it is night for the dead). According to the belief, the localisation of the living is to the East, where the sun rises, and the dead, who do not accept sharing their territory with the living, dwell in the West. There are only a few exceptions, for the dead try to lure those who are ill out to their villages and also make appearances so as to scare people who go into the jungle or to the river alone (Cunha, 1978 apud Fabrício, 2017, p. 24).

In the excerpt above, there is a displacement in the way the concept of a map is operated; there are intensive lines inserted in the very life of the Amerindian tribe, without ceasing, however, to demarcate their territories, to trace it. The condition for the map to become visible is precisely the possibility of intensive relations to take effect among this tribe's inhabitants, their dead, the sun, their dwelling places and geographic directions. In this case, the map is already the intensive force field that draws the lines, levels, displacements, flights, because this is about establishing force relations that instate and mobilise power. This conversion of the map into tracing takes place immediately by means of an image that stratifies the variables that condition the map to its destiny of continuous opening and connection with all of its dimensions. When the tracing translates the map into image, what it extracts and fixates are the points of coagulation: "What the tracing reproduces of the map or rhizome are only the impasses, blockages, incipient tap-roots, or points of structuration." (Deleuze; Guattari, 1987, p. 13).

Anatomy forged, from the sixteenth-century onwards, a model of organism by means of a discursive and visual regime. Anatomy resort to a traced record that only reproduces the blocks, gridlocks and structuring points that establish and fixate an image for the body. Anatomy avoids taking the body as multiplicity, it eliminates its multiple aspects by imposing a structure: "Whenever a multiplicity is taken up in a structure, its growth is offset by a reduction in its laws of combination" (Deleuze; Guattari, 1987, p. 6). This quote is similar to an enunciation of mathematical proportion: the reduction in the laws of combination within a multiplicity is proportional to its growth imprisoned within a structure. The organisation exacted by anatomy renders the body as a part of a restriction that distributes organs and functions grounded on the reduction of the laws of combination. It is the permanent reduction of the laws of combination between organs and functions that is the necessary condition for the organism to establish itself as order, as a transcendental structure that imprisons the living matter and its multiplicity within an invariable cohesive organisation.

Anatomy's methodological procedures block agency, because each organ, in the structure it creates, must be placed exactly in a point that does not allow any kind of exchange. This is why this structure could only have been created by tracing a dead body that has lost its capacity for agency, for variation, because the visual project about the body that modern anatomy inaugurates is precisely the record of this traced body, by means of which all multiplicity is lost, all variation, but also because tracing is already the reduction of the laws of combination in a given structure and the condition for the invention of an organism.

For anatomy, the distribution of organs and their organisation follow procedures whose properties remain invariant, while the distribution of organs on a composition plane adheres to such properties, allowing for morphological variations such as: to pull, to extend, to crumple, to transform. In other words: organs that expand and deflate (lungs), organs that contract and relax (muscles), organs that harden and shrink

(penis), organs that pulsate in temporal variation (heart), organs that dilate and contract (pupils), organs that contract or dilate with temperature (skin), organs that close and open (anus, mouth); intensive variations of a mass without form:

No organ is constant as regards either function or position [...] sex organs sprout anywhere [...] rectums open, defecate and close, [...] the entire organism changes color and consistency in split-second adjustments (Burroughs apud Deleuze; Guattari, 1987, p. 153).

As we approach the intricate anatomical atlases we find that a body-person's *pathosformel* survives, operating in the presented body models. When we detect the representation that codifies certain bodies into images, fixating points of coagulation (Deleuze; Guattari, 1995), our idea was not to throw away the atlases, but to understand them as “[...] a visual form of knowledge, a wise way of seeing” (Didi-Huberman, 2018, p. 18). The points of coagulation – coinciding body and image – can be untied in order to be reassembled under the light of its gaps. This is the character of the atlas: gutter-images, like those in comic books. In the gaps between one image and the other, one excavates. This void, this without-meaning, this not-knowing summons us to excavate the images *ad infinitum*. Thence the possibility of the restitution of multiplicity to the body-person that, as it allows for the de-coagulation by means of the gutter-image, “invents, in the midst of all this, interstitial zones of exploration, heuristic intervals” (Didi-Huberman, 2018, p. 19). And, in this sense, the atlases can be considered “[...] an instrument not of logical exhaustion of given possibilities, but of the inexhaustible opening up to the not yet given possibles. Its principle, its engine, is the imagination” (Didi-Huberman, 2018, p. 19-20).

In the cognitivist sphere, which grounds the learning society and, as a consequence, the cultural pedagogies, it becomes central to excavate in the images the meanings that evade them, that is, the non-meanings. Not so that the medicine and related areas' student may produce a single idea about the body and corporeity, but so that one may compose the meaning and the without-meaning in the image to produce another way of dealing with corporeity and life, for instance, the faceless life above identitarian agendas, which has operated in the attempt to reduce life and its multiplicity to two single forms (man or woman). However, why not a man and woman in a single corporeity, unused to the single discursive content-form of men or women? The without-meaning here does not concern the leaving behind of disciplinary fields and their knowledge, but, instead, refers to the way in which these propel us to connect already known and mapped model bodies of men and women with the border-bodies, which are neither one nor the other.

Final considerations

As I publish this text with a figure from one of the countless UNESCO's publications, I intend to show how a given idea of the teacher

was erased by current cultural pedagogies. In the epicentre of an educating society, culture, materialised/objectified into artefacts, educates us, whether we want it or not. It is not about being *a priori* aware or not of how we are educated and subjectified, at every moment, by the everyday spatial and visual cultural contexts to which we are exposed, at the same time as we ourselves transform them. I have presented the way in which the anatomical atlases teach us how to look at the body-persons and how to govern them, but other possibilities are also given by the very same artefacts as we employ their engine *par excellence*: imagination. This, understood here as “a transversal knowledge [...] by its intrinsic assembling potency that consists in discovering” (Didi-Huberman, 2018, p. 20), is what will allow us to penetrate the gutter of images so that we may discover from them the inexhaustible *pathosformel* and polyphonic universe of the anatomical atlases. This is, then, the power of the atlas: before imagination, its movability and provisional character are something of the order of the un-circumscribable, after all:

Imagination accepts the multiple and constantly leads it back to detect in it new ‘intimate and secret relationships’, new ‘correspondences and analogies’, which will be themselves inexhaustible, as much as it is inexhaustible all thinking about the relationships that a new assemblage, each time, will be susceptible to manifest (Didi-Huberman, 2018, p. 20).

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Notes

- 1 Sited in Hamburg, Germany, UIL is one of UNESCO’s six educational institutes; it is a non-profit international research, training, information, documentation and publishing centre about literacy, non-formal adult education and life-long learning. Information available at: <<http://uil.unesco.org/lifelong-learning>>. Access on: September 24 2018.
- 2 Translation from the original: “[...] en hacer que cada individuo se sienta constantemente responsable no solamente de lo que hace (y que define, desde siempre, lo propio de la noción de responsabilidad) pero que assume como siendo la causa de la totalidad de las cosas que le acaecen (principio de responsabilización)”.
- 3 For more information about the concepts of visibility and sayability, cf. Durval Muniz Albuquerque Junior (2014), Gilles Deleuze (2013) and Michel Foucault (2013).
- 4 About the definition of cultural Pedagogy, see Paula Deporte Andrade and Marisa Vorraber Costa (2015a, 2015b, 2017) who “excavate” the conditions of the rise, dissemination and uses of this concept in Brazil, especially from the meeting of Cultural Studies and Education.
- 5 The second edition dates from 1555 (Kickhöfel, 2003).
- 6 This is the latinised form of *Andries van Wesel*.
- 7 Regarding medical rationality cf. Camargo Jr. (2003).

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