A população negra africana e da diáspora no desenvolvimento tecnológico

The black african and the diaspora population in technological development

DOI:10.34117/bjdv8n1-429

Recebimento dos originais: 07/12/2021
Aceitação para publicação: 24/01/2022

Felipe dos Santos de Almeida
Graduando em Eng. Mecânica e Bolsista PIBIS, pela Universidade Federal do Paraná
Endereço: Av. Cel. Francisco H. dos Santos, 100 - Jardim das Américas, Curitiba - PR,
CEP 81530-000
E-mail: felipe.dsdalmeida@gmail.com

Harrison Lourenço Corrêa
Doutorado em Química, pela Instituição Universidade do Estado do Rio de Janeiro
Instituição: Universidade Federal do Paraná/Setor de Tecnologia
Endereço: Av. Cel. Francisco H. dos Santos, 100 - Jardim das Américas, Curitiba - PR,
CEP 81530-000
E-mail: harry.lou.correa@gmail.com

RESUMO
Durante o período de colonização do Brasil, baseado no trabalho escravo e caracterizado por diversos ciclos econômicos, muitas conquistas obtidas pela classe dominante deram-se a partir de conhecimentos e tecnologias trazidas pelos povos africanos. Engenhos, ferramentas, técnicas agrícolas, religião e cultura são alguns exemplos da inegável contribuição da África ao Brasil, à ocasião, um país ainda em desenvolvimento. Os africanos, vindos à força para contribuir como mão-de-obra escrava, tiveram esse regime de trabalho chancelado pelo sistema de hierarquização pautado na classificação de raças. Estabeleceu-se, assim, um status quo que perdurou por séculos, cujos desdobramentos são até hoje perceptíveis na sociedade brasileira. Não bastasse a violência pela qual um povo subjugado foi forçado a sofrer, os africanos tiveram seus saberes apropriados sem, contudo, terem direito a algum crédito sobre seus feitos. O presente trabalho objetiva mostrar como as relações de poder estabelecidas no período colonial (baseadas no eurocentrismo) foram determinantes para anulação de um povo e seus descendentes. Mais especificamente, pretende-se mostrar o quanto o povo negro teve e tem sua representatividade na tecnologia mundial e, em particular, no Brasil.

Palavras-chave: Diáspora, inovações, Brasil, racismo.

ABSTRACT
During the period of colonization of Brazil, based on slave labor and characterized by its several economic cycles, many gains obtained by the ruling class were derived from the
knowledge and technologies brought by the African people. Devices, tools, farming techniques, religion and culture are some examples of the undeniable African contribution to the development of Brazil. The Africans, who came forcibly to be used as slave labor, had this work type endorsed by the hierarchy system based on the race classification. Thus, a status quo that lasted for centuries was established, and its consequences are visible in the Brazilian society to this day. Yet, not only there was the violence to which the African people suffered, these subjugated people also had their knowledge appropriated and therefore never being given the deserved credit for it. This study aims to present how the power relations established during the Eurocentric colonial period were decisive for the annulment of a people and their descendants. More specifically, it is intended to show how black people had and still have their representativeness in the development of technology in the world and, in particular, in Brazil.

Keywords: Diaspora, innovations, Brazil, racism.

1 INTRODUCTION
RACISM IN THE HISTORICAL CONTEXT

Numerous cases of racism are perceivable, not only in Brazil but also in the world. They are motivated by several reasons, such as social, political, cultural and economic factors. None of these reasons, however, are sufficient to justify such practices, since its results only led to the humiliation, subjugation, and taint of the image of others. According to Carlos Moore (2012), millenarian records already mentioned the aversion towards the black figure. Ancient myths of non-African societies showed repulsion and fear of the black color, often associated with symbols opposed to all that is related to good regarding Man, e.g. grief, darkness, evil, danger, diabolical. Guimarães (1999) conceptualizes race as something that does not correspond to the natural reality, but which denotes a social stratification based on a negative attitude towards certain social groups.

Rigveda, the oldest book in a trilogy of Indian sacred scriptures, for example, evokes the black race inside a context of conflict and evil. In one of its excerpts, Indra, a demigod leader of the Aryan invaders (people of “noble” skin), orders his warriors to "destroy and eliminate black skin from the face of the Earth" describing great combats between white and black people in a light and dark setting (MOORE, 2012).

Through a historical survey, more specifically by analyzing the processes of colonization and the use of slaves as free labor, we can see how race presents itself as an element that helps to establish the capitalist power. Therefore, the concept is a pillar to the maintenance of the power of the white people over other races, permeating itself over time and giving form to Eurocentrism.
Moreover, in the fifteenth century, slavery dominated the religious debate, since there was an ongoing discussion about whether or not the dominated peoples of Africa and the Americas were descendants of Adam and Eve. Bartolomé de las Casas, a fervent defender of native Americans, claimed that they should be considered children of God. Thus, he proposed that the colonizers should enslave the Black instead, arguing that they were not children of Adam, but of Ham, Noah's denied son. Such was his commitment to Native Americans that King Ferdinand of Spain granted him the title of “protector of the Indians” (ACTON INSTITUTE, 2019). Thus, the argument that would define the destiny of many, and which its consequences would endure for centuries leaving scars up to the present day, was created. Black people, by curse and divine decision, would be destined to serve and to live in subservience.

If it was not only enough for religion to determine who could or could not be enslaved, race as a concept was further developed over the following years. Carl von Linné, for example, used his knowledge as a naturalist to establish a human classification based on race, followed by values that suggested a possible hierarchy.

From this point on, the basis of a relationship between biological features and moral, psychological, intellectual and cultural qualities was founded, categorizing races as superior and inferior. The devaluation of black people began to be based on the thesis of their biological inferiority, valuing the ideal of whitening (JACCOUD, 2008).

- American: dark, choleric, stubborn, lover of freedom, governed by habit.
- Asian: yellow, melancholic, governed by opinion and prejudice.
- African: black, cunning, lazy, negligent, governed by their bosses.
- European: white, sanguine, muscular, resourceful, inventive, governed by law.

The concept of racism based on biological aspects began to change in the 1970s. During this period, the central axis of what defines racism changed, moving from the scientific to a cultural and ethnic conception of race. Racism, grounded on the ideology of different races, would be a way to naturalize social life, to explain personal, social and cultural differences, and to justify hierarchies by imposing relations of domination and power, inequalities and subordination.

That being said, Brito et al (2017) affirm that the most cruel facet of colonization – and, more specifically, the Brazilian – was the redefinition and generalization of cultural patterns to a single scenario. The result of this process was the dissolution of the knowledge produced by the people who were not colonizers.
RACISM IN BRAZIL

Historically, slavery in Brazil has benefited white populations who have accumulated wealth through slave labor. Therefore, the slave regime helped to consolidate white dominance, facilitating the persistent reproduction of social inequality.

Such inequality was perpetuated in many spheres, not least of which includes education. In order to meet the demands of a growing country, night schools were opened at the end of the nineteenth century. However, enslaved Black – and, commonly, freedmen as well – were forbidden to attend these spaces. Thus, during the colonial period, enslaved Africans could not learn how to read and to write. The only exception were the black slaves who worked on the Jesuit farms, since they received basic studies based on the Christian doctrine which aimed at their moral education. (GONÇALVES, SILVA, 2000).

It turns out that, in Brazil, the end of slavery was not enough to eliminate the phenomenon of exploitation and colonization, since the Black were ‘freed’ to marginalization and discrimination. Afro-Brazilian workers were removed from the labor market and replaced by European immigrants, who were supported by local farmers and by the government. In this scenario, political decisions were interspersed by opportunism. The result was an aggravation of inequalities, with a restricting view regarding the possibilities to socially integrate the black population. Florestan Fernandes (1964) is categorical in affirming that for the Black in Brazil there were only two possibilities left: to accept being the scum of the urban working class or the idleness hidden in involuntary unemployment.

As Brito et al (2017) highlight, the process of building stereotypes around the Black and the absence of positive references in the content covered by schools syllabus, together with the erasure of the contribution of the African peoples in the development of knowledge, science and technology, consolidated the Afro-descendant inferiority. According to the authors, it is important to expose students to positive references of African ancestors. Thus, Brito et al. affirm that schools and education can contribute to the improvement of self-esteem by establishing notions of belonging and self-acceptance.

The Law 10,639/2003 makes the teaching of Afro-Brazilian and African History and Culture in the schools mandatory. This can contribute to the establishment of self-esteem and self-knowledge of African descendants, since it passes on valuable information about the legacy of the African peoples (beyond religion and culture) to new Brazilian generations. Technological participation is perceived even in religion, which is
strongly embraced by the Brazilian society. Consequently, unquestionable influences of Africans can also be noticed in this field. For example, as presented by Andre et al., the steelmaking of religious symbols and images represented the mastery of iron smelting techniques by Africans (ANDRÉ et al., 2017)

TECHNOLOGY OF THE AFRICAN PEOPLES

The unfolding of a historical foundation that differentiated men and women exclusively by race hierarchy (an endemic event during the period of African and American colonization) resulted in the appropriation of knowledge on the part of the colonizers. These, holders of formal education, had the opportunity to theorize concepts that were already applied by Indigenous and African populations. From this appropriation, the misconception that Europeans were the only responsible for the development of many technologies arose. This, in parts, is not in line with the historical context already demonstrated in this paper.

There are many examples, already documented (by European scholars, no less), of the contribution of African peoples to modern technology. Unfortunately, the propagation of such evidence does not occur with the same speed and efficiency with which Eurocentric illusions spread. If we take the image that propagates about Egyptians as an example, we realize that the collective imaginary almost always associates the pyramids as being the result of extraterrestrial construction and technology. That is, the fact that African Egyptians, through their strength of their workforce and their knowledge, conceived and constructed such structures is simply ignored.

However, this is not the only example. In the field of mathematics, records indicate that scripted books already included operations such as division, multiplication of fractions, and equations to determine volume and area, as well as estimates of pi, reaching a number of 3.16. In astronomy, the Egyptians developed clocks by studying the movement of the Sun and the cycles of the Moon (SERTIMA, 1983; WOODS, 1988). According to Machado (2019), mathematics and astronomy were originated in Africa. Therefore, an inheritance of culture and history has been diluted and improperly appropriated for centuries by a class dominant and active during the colonial period, resulting in the imposition of new forms of knowledge production (BRITO, 2017), and thus creating Eurocentrism.

In his book Stolen Legacy, James (1992) points out that, when Egypt was invaded, Alexander, the king of Macedon, acted decisively to eliminate any traces of African
influence in the production of knowledge, taking with him books of philosophy, science, and religion. This important fact in the history of mankind, which propagated the misconception that Africans did not contribute to the development of science, led Farrington (1961) to raise the question of the Greek debt to the early civilizations.

As an example of the African domain on mathematical notions, the Mancala board stands out. As André et al. (2017) observed that, although it appears to be simple, Mancala games can be complex, requiring reasoning, calculation, strategy and reflection for decision-making before each move. These games motivate the use of counting techniques and probabilistic analysis, requiring mastery over notions of symmetry, quantity, successor, and predecessor. According to Santos (2008), mathematics is present in this type of playful game from the construction of the board itself, which is marked by different geometric designs.

The University of Sankore had no central administration. Instead, it was composed of independent schools and units, each led by a professor. The courses were taught in the internal gardens or in private facilities. The main subjects focused on Islamic teaching, laws and literature, and there was also space for teaching arts, medicine, mathematics, physics, chemistry and philosophy.

There are studies referring to the translation of manuscripts from Timbuktu (the capital of the Mali Empire), at the University of Sankore, in which it is indicated that the development of knowledge is associated with astronomy (based on heliocentrism) and mathematical calculations to diagram the planets and their orbits (BRITO, 2017).

Records indicate that, during the twelfth century, about 25,000 students went to University in a city of 100,000 inhabitants. One of the most prominent attendants of the University of Sankore probably was Ahmad Baba as-Sudane (1564-1627), also the last “rector” of the institution. As-Sudane wrote more than 60 books on several subjects, which include law, medicine, philosophy, astronomy, and math (among other topics). Moreover, he was considered a renowned professor and jurist (KHAIR, 2019), who, in his period of exile, wrote many books related to law. However, his writings went beyond the practical and legal realm. His work became in fact essential for the discussion of the behavior that some North Africans adopted in relation to the slavery of the people from the West who, according to Ahmad, were based on race. (CLEAVELAND, 2015).

Still following Cleaveland (2015), Ahmad stood in the spotlight of historians from the second half of the twentieth century because of his treatise on slavery.
ECONOMIC CYCLES IN BRAZIL AND AFRICAN TECHNOLOGY

The History of Brazil, especially of its initial economic cycles (sugarcane, gold mining, cotton and coffee), is admittedly based on the use of slave labor, through the subservience of the African peoples brought here on slave ships and whose condition was extended to their descendants. Regarding the gold cycle, for example, even before the Portuguese and Spanish massive exploitation, the Africans’ knowledge on gemstones extraction around Ghana, Guinea and Mali already existed before the Christian Era (ARAÚJO, 2013). When it comes to the contribution of the Africans to Brazil, the common perception is that their contribution to the development of Brazilian society is limited to their religion and culture. However, little or nothing is said about these peoples’ contribution in the technological field. The following section will address the areas in which there was African contribution in Brazil which, for many decades, were neglected.

Textile technology

Although the popular imagery associates the African slave from the colonial period to the figure of an unclothed person, this conception proved to be mistaken. Since their unwilling arrival in Brazil, the Africans contributed to the introduction of a peculiar weaving technique for various purposes: clothing, sleeping nets (which its current production in the Northeast remains using the same technique), sailboats and sacks for packaging agricultural and food products (CUNHA, 2010). In addition, another remarkable contribution was on textile techniques: Nigeria, Congo, Madagascar and Morocco were already well known for their production of carpets and fabrics before 1500 A.D. In these places, the techniques mastered were not only for the obtainment of vegetable and animal fibers, but also for dyeing (both production and fixing).

Figure 1. War Flag (National Museum of Brazil).

Figure 2. n/n Replica of the War Flag, made using raw linen, with applications of black and red fabrics (National Museum of Brazil).


Construction

Perhaps one of the great contributions of the African people in the area of construction is the adobe, a brick of raw earth built from the mixture of clay, vegetable fibers, livestock manure and oils (animal and vegetable). Its production technique is based on drying first in the shade and then in the sun. This brick had already been widely used in the region of the Niger River (CUNHA, 2010).

Soap production

The Port of Salvador, in Bahia, was the moorage of many products from Africa, one of them being soap. The technique for its production was relatively simple: they were produced from a mixture of animal and vegetable fat (extracted from tallow and boiled meat and coconut) and soda, which was produced with the ashes resulting from the process of burning specific woods (CUNHA, 2010).

Tools

In Brazil, wood has been used for centuries, in sugar mill machines, looms, furniture, transportation and also in arts in general.

Figure 3. Wooden spoons (National Museum of Brazil).

Regarding the sugar economy cycle in the Brazilian colonial period, it is essential to address all the stages involved in the agricultural production: firstly, there was the preparation of the soil, the planting, burning, harvesting, and milling, and then the obtaining of molasses and refining. All these stages depended on slave workforce, formed mostly of Africans who were already familiar with these agriculture techniques. As Machado (2003) emphasised, there are indications that a plant of sweet essence, similar to sugarcane, was already used in New Guinea. It was then taken to India (in the Gulf of Bengal), from where there are older records of its existence.

Besides, according to André et al (2017), sugarcane was already cultivated by the Islamic people who, after contacts with the Portuguese, were subjugated to the slave regime. They took action in Island of Madeira and Island of Azores, which served as the basis for the Brazilian colonization. The technology for the construction of milling
devices was already employed by Africans in their own continent. However, according to André et al (2017), the difference was that in Brazil there was a society structured by the attempt of colonization and settlement that guaranteed the security of the colony.

Furthermore, Araújo (2013) points out that the Brazilian agriculture was developed from three generations of hoes: two of African technology and one of English technology. At first, the hoes came from Congo and later they started being produced by Africans in Brazil. Comparative studies on metallurgy among these tools have shown that, until the nineteenth century, those African tools were still the best in quality.

SCIENCE WITHOUT BORDERS (CSF): THE PARTICIPATION OF AFRO-BRAZILIANS

On the one hand, the historical summary of Brazil as a colony and the fact that the income concentration was retained in a small part of the population is a representation of how our economy and development was based on regimes of subservience and exploration of enslaved Africans. On the other hand, this scenario seems to be in flux. Programs such as Science without Borders (CsF), adopted in 2011 by the Federal Government, can be seen as a strategy to minimize the social effects caused by decades of colonialist exploitation, which left indelible marks in the Brazilian contemporary society. Since the program was implemented and the information about “ethnicity” was included in the application form (2011 and 2013), there was a representation of around 25% Afro-descendant participants (BRASIL, 2019).

Along with this process of integration of Afro-Brazilians to access education, law 10,639/2003 stands out. By sanctioning it, Brazil took an important step towards the adoption of affirmative actions aimed at the Afro-Brazilian population. During its reading, the reparatory nature and appreciation of the Afro descendants history, culture and identity was noticeable. Therefore, the aim is to disseminate and produce knowledge that allows citizens to “be proud of their ethnic-racial belonging [...] in order to interact in the construction of a democratic nation in which every one, equally, have their rights guaranteed and their identity valued” (BRASIL, 2004).

Although this law passed around 15 years ago, it is ought to be an essential tool for the establishment of a culture that values the Africans, who not only contributed to culture and religion, but also to agriculture, construction, foundry and weaving.
2 CONCLUSIONS

Although evidences of subjugation – of one people over another through race hierarchy – take us back to distant periods of humanity, the European colonization of the African and American people allowed that the appropriation of these people’s knowledge became more accentuated. There are numerous examples in historical records that demonstrate the African peoples’ mastery of technologies, such as in agricultural, foundry, construction and textile activities, as well as the already recognized contributions in music and religion. The law 10,639/03, which establishes the mandatory teaching of African and Afro-Brazilian Culture and History in all subjects of Elementary and Secondary education, along with other instruments of the government – such as the program Science without Borders (CsF) – allow the improvement of important public policies. Such policies aim at the recovery of identity for many Afro descendants, who come to know and value the contribution of the African peoples to technological development and human inventiveness.

ACKNOWLEDGMENTS

The authors are grateful to the Federal University of Paraná and the Araucária Foundation for their financial support via the Support Program for Social Inclusion, Research and University Extension and the Academic Publishing Advisory Center (CAPA – www.capa.ufpr.br) of the Federal University of Paraná for the manuscript translation.

Authors’ contribution

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Harrison Lourenço Corrêa and Felipe Almeida. The first draft of the manuscript was written by Harrison Lourenço Corrêa and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.
REFERENCES


