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3. Digital pathways for enriched communities and futures: Plantation heritage in São Tomé and Príncipe

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Abstract

In revolutionizing the type and the speed of information available, digital globalization has reshaped perspectives and cross-border actions in various domains worldwide. However, these knowledge-intensive flows have scarcely influenced practice around heritage in least developed countries (LDCs). Historical biases, exacerbated by systemic inequities and ethnic divisions, still represent some of the most relevant barriers to 21st-century development, inhibiting the appropriate valuation of shared cultural heritage. This study seeks to shed light on the *roças*, a widespread system of cocoa and coffee plantations established in São Tomé and Príncipe by Portuguese colonizers of the mid-19th. We show how *roças* and other shared heritage sites represent living sources for intergenerational learning. E-learning tools can be an important driver of systemic cultural overhaul, sustainable heritage management, global peacebuilding, and social cohesion, provided that broad communities, including descendants from former colonized countries, are actively involved throughout the critical design process of reinterpreting those sites.

Keywords: shared heritage, heritage plantation, cultural decolonization, e-learning tools, São Tomé and Príncipe.

Introduction

Today we are faced with the controversial question of how to critically rethink heritage sites that were shaped under centuries of European colonialism. However, practical results have been slow to follow from this debate[1]. It was once the case that European institutions showed a lack of interest in the topic, a tendency that José Mattoso attributes to the disintegration of the former European empires having fostered a strong disinterest in their cultural legacies (Mattoso *et al.* 2010). This attitude is hopefully now in the past, as testified by several initiatives[2] on the part of cultural institutions such as ICOMOS, UNESCO, and the Dutch

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[1] An example of the bureaucratic or operational slowness in Portugal is the proposal of *The Slavery Memorial* in Lisbon in 2008, submitted for approval under the Participatory Budget (a policymaking tool which allows citizens to participate in public budgeting decisions) then accepted in 2017 together with the interpretative center on slavery and colonial history. Planned for installation in *Campo das Cebolas* and strongly promoted by the *Djass – Associação de Afrodescendentes*, these memorials have still not been executed (Santos, 2020). Public debates on this topic in Portugal are briefly addressed by (Santos, 2020).
[2] See*, e.g.,* https://www.icomos.org/en/77-articles-en-francais/72051-18-april-2019-theme-shared-cultures, https://en.unesco.org/shared-heritage and https://dutchculture.nl/en/introduction-shared-cultural-heritage

Cultural Heritage Agency. A number of activists and heritage professionals from diverse disciplines – critical heritage studies, anthropology, architecture, human history, and digital humanities – argue that the situation should be addressed starting by bringing their respective disciplines into dialog, adapting their respective tools and methodologies to a holistic approach (AA.VV., 2009, 2020)[3]. Giving voice to unheard multiethnic communities, such as the living descendants of the workers from the colonized countries, some of them now Europeans, will make it possible to reverse Eurocentric dominant narratives.

The issue is a thorny one, transcending cultural and geographical boundaries. The transnational scope of intervention arises from the dual parenthood of the shared heritage places, whose construction materials and techniques, habits, traditions, and memories belong to both colonized and colonizer. Indicating this dual parenthood, the term *shared cultural heritage* has been widely employed to recall the latent value embodied by material and immaterial assets related to colonial periods, beyond confined temporal and spatial realms. As defined by ICOMOS[4] and by the Dutch Cultural Heritage Agency "*The Netherlands* [and to large extent other European countries] *shares a past with many nations and cultures around the world. These connections have left traces, commemorating the rich and complex history that we share. Think of buildings, archives, shipwrecks, museum collections and intangible heritage. These traces of a connected past are referred to as shared cultural heritage.*"[5]

We are launched in an even larger dimension when we consider the forced labour that bloodies thousands of pages of colonial history, one in which we must view nationalist colonisations and economic monopoly-related disputes as a world-spanning process. The *Atlantic World history*[6] arises from global trading relations between European, American, and African countries. The rise of the concept of Europe, as the locus of cultural interconnections and trade between colonizers (the Portuguese, Spanish, French, and Dutch especially), may be traced back to the transnational colonial markets made possible by the massive exploitation of land undertaken in their colonies from the 15th century onwards (Barros, 2015).

As a case in point amid this complex picture, we analyse the plantation heritage sites in São Tomé and Príncipe (STP) known as *roças* (*clearings*)[7]. The shape of architecture and the future planned for these plantations evoke the same unsolved questions around world shared heritage[8],

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[3] Relevant research project: *Pressing Matter: Ownership, Value and the Question of Colonial Heritage in Museum*, promoted by The National Museum of World Cultures (NMVW) and the Vrije Universiteit, Amsterdam (VU). See also, https://decolonizingmuseums.com/

[4] https://www.icomos.org/en/77-articles-en-francais/72051-18-april-2019-theme-shared-cultures

[5] https://english.cultureelerfgoed.nl/topics/shared-cultural-heritage/what-is-shared-cultural-heritage

[6] The term the *Atlantic World* was used between 1949 and 1973 especially by western historians (Canny, 2001).

[7] Berthet associates the polysemic term of *roças* to *plantations*, the capitalist system for the production of monoculture for the international market (Berthet, 2012) and explains different interpretations provided by Tenreiro (1961), Eyzaguire (1993), Nartey (1986). Etymology: areas of brushwood (*mato*), small farming land (for the cultivation of *mandioca*, *milho*, *feijão*); rural area; field. The verb "*roçar*" means "*pull out, tear down the vegetation, cut, cut down bush or vegetation*".

[8] In critical heritage studies, those artefacts with inherent trauma, such as those from fascism in Italy (1920s-1930s) or from the communist regime in Eastern Europe (1950s-1980s), are labelled as *undesirable heritage*

questions marked by *colonial aphasia* (recalling Stoler's concept applied to French colonial history)[9], institutionalized histories, or current short-sighted tourism policies.

We begin by presenting an historical framework of the *roças*, followed by a brief discussion of the necessary heritage preservation actions (Section 2). We then discuss the importance and the complexity of adopting a decolonized perspective (Section 3). In the last section, we examine challenges and concerns in potential applications of digital technologies to the *roças* as a way to uncover this shared past and inform preservation practices. We identify the potential offered to the target groups (the general community interested in cultural heritage and students of architecture) by the applications of e-learning tools within possible avenues of inquiry, in parallel with potential risks (Section 4).

This study is situated in the broader framework of the critical rethinking of shared cultural heritage. It contributes to outlining limits and challenges of the application of digital technologies towards social inclusion, approaching a decolonized perspective. We discuss the controversy that attends the process of material and visual recollection of architectural colonial legacies, regardless of the type of human-device interaction and the modality of access, and consider how these difficulties should be incorporated in the design of the e-learning tools.

Architectural framework: Plantation Heritage in São Tomé and Príncipe

Brief description and literature review on architectural design of the roças

Among the numerous territories colonised by Portuguese settlers[10], the small archipelago of São Tomé and Príncipe, located in the Gulf of Guinea along the West-African coastline, epitomized the western exploitation set up by European colonial empires in the bean belt, by leveraging extraordinary environmental conditions. This small insular territory, formed by the two major islands of São Tomé (836 km^2) and Príncipe (128 km^2), is known as *ilhas do meio do mundo* (*the islands in the middle of the world*), being located approximately at the intersection between Ecuador and Greenwich meridian.

The islands were seized and exploited under Portuguese colonial hegemony during two main waves of colonization. Following the first phase in which the previously uninhabited islands were settled (1471-1472), the development of the sugarcane monoculture and the creolization during the third Portuguese Empire (1825-1975) arose from intensive cocoa and coffee plantations and the tightening of colonial hierarchy and racial inequalities. The trade in commodities intensified to the point that these small insular areas became a key part of the

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(Macdonald, 2006), *difficult heritage* (Macdonald, 2015), *negative heritage, dissonant* or *unwanted heritage*. More interestingly, Innocenti constructs the idea of *migration heritage* (Innocenti, 2016).

[9] "*a difficulty retrieving both conceptual and lexical vocabularies and, most important, a difficulty comprehending what is spoken*" (Stoler, 2011). See (Stoler, 2016)

[10] Being an expression of imperialism and adaptation of European design patterns and cross-cultural influences, the vast heritage assets were built under the Kingdom of Portugal over three periods (1415-1580, 1580-1822, 1822-1999). These include historic urban centres, military fortresses, hospital facilities, religious and civic monuments, public squares, and cultivation of the natural landscape (Mattoso, 2010).

global geostrategic map by the end of the 1890s[11]. São Tomé was the world's largest cocoa producer in 1910s and a main slave depot until the mid-17th century. In Portugal, Lagos and Lisbon were crucial ports in the Atlantic slave trade from 1526 to 1867, a global market involving an estimated 12.5 million enslaved Africans around the world.

The human and symbolic geographies of these stunning islands are marked with over two hundred *roças*, cultural legacies of the massive cash-crop production of the Portuguese second colonisation. *Roças* historically acted as large-scale structural and structuring entities in the cultural-socio-economic spheres. Being organized as multifunctional complexes, they include a hierarchical group of houses (grand administrator's mansion [*casa-senhorial*], housings for European and for African plantation workers and their families [*senzalas*]), huge production services (warehouses, greenhouses, bean-drying sheds), and supporting facilities (hospitals, schools). Regardless of their extreme variations, each settlement type was structured to optimize the production of intensive monocultures.

In approaching the history of São Tomé and Príncipe, scholars tend to focus on the mutual relations between Portuguese and tropical cultures in an intermingling of forms, traditions, styles, and cultures, so that "*A memória colectiva recicla constantemente este tecido fundador*".[12] Distinct languages, functions, and roles characterize each social group living in *roças* across time. As their function has continued to be updated in the image of the settler-colonial power, *roças* represent the convergence and divergence of multiple levels of collective and individual memories, reflecting different types of cohabitation, ethnical divisions, and conflicts among *roçeiros* (plantation owners), farmers, workers[13], and *filhos da terra* (sons of the land). To give an example of the coexistence of a plurality of views even among the workers in the same *roça*, Åkesson (2016) thoroughly contrasts the collective national memory of Cape Verdean national history with the personal history of an elderly Cape Verdean man, senhor Fernando, who worked in 1952 until 1960. "*A central theme in his narrative is how he acquired agency by being a good worker*" (Åkesson, 2016:68).

Regarding their spatial layout, *roças* are divided into four types in the literature according to the territorial element around which the settlement was organized: avenue, farmyard, harbour, or city (*roça-avenida*, *roça-terreiro*, *roça-porto*, *roça-cidade*). The layout is organised following production-based logics, whose primary objective is the optimization of the production resources. Machado da Silva stresses how the supposed approximation of the condition of the labor force to that of the European class was materialized at the level of volumetry, façade design, access/flow composition and spatial organization the constructions. The spatial organization of the workers' houses (*senzalas*) program remains unchanged over time, as physical expression of the embedded unequal social system (Machado da Silva, 2018).

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[11] Sacks of cocoa (50-kilograms) were shipped to Lisbon and from there to Hamburg, Le Havre, New York, and London (Macedo, 2016; Nascimento, 2002).

[12] "*The collective memory constantly recycles this core tissue* "(Henriques, 2019)

[13] The workers in *roças* were recruited from Angola, Mozambique and Cape Verde (Seibert, 2013; Nascimento, 2002).

From an architectural point of view, the *roças* derive from European patterns adapted to the tropical environment by means of distinct construction systems: vernacular wooden structures (16th century), clay-filled timber framework systems (19th century), and concrete systems. Each system was an adaptation of Portuguese design patterns applied to building practices (labour force, raw materials) and cultural realms (workmanship, planning strategy), adapted to the local environmental constraints (topography, weather). These recall the fishermen's cabins, the *pombalino* system (the anti-seismic construction system used mainly after the 1755 earthquake in Lisbon), and the early concrete systems, respectively.

The overview of architectural configuration, zoning, and Europeanisation has so far been mostly written in the Portuguese language (Guedes, 2021; Fernandes, 2005; Nascimento, 2002; Tenreiro, 1961; Mantero, 1910). Recent studies based on fieldwork and an extensive literature review have been carried out in the doctoral dissertations of Portuguese researchers[14]. These works offer a critical and insightful picture of architectural heritage that is stained with the crimes of prolonged exploitation. However, these works surprisingly inspire the desire to discover *roças* in the tropical forest for oneself, to get entangled in their history and lost memories.

What is needed? Integrated heritage preservation actions: critical analysis of polyvocal memories on the roças and rethinking on how to preserve them

What is apparent from the above-mentioned on-site surveys and in-depth analyses is the extraordinary beauty of these sites and their environmental context, as well as the variety of original layouts and their feasibility of converting their original uses, especially after São Tomé and Príncipe (STP's) 1975 independence from Portugal[15]. These surveys also show that most of these settlements risk being abandoned to their fate, too numerous, grandiose, and expensive to maintain their preservation and reuse.

In recent decades, certain of the *roças* have shown extraordinary resilience in a variety of solutions. These constructions have been converted into thematic museums, local businesses, refurbished luxury hotels, or popular squats, while a few settlements are still used for cacao harvesting or other agricultural activities. Other *roças*, endangered by neglect and shortage of funds, are now useless skeletons close to being lost to history. Almost swallowed by the equatorial forest, many buildings are on the verge of collapsing – roofless, with extensive damage and loss of the structural components and architectural features.

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[14] These researchers base their works on previous inventories, some of which were carried out in the mid-twentieth century by Tenreiro (1961), among others. Machado da Silva provides in-depth architectural and historical analyses of *Água Izé*, *Boa Entrada* and *Rio do Ouro,* while Ana Fernandes analyzes the state of conservation, the typology, genesis, and layout of the settlements across time. Both provide in-depth analyses of selected case studies, suggestive photographic records, and 2d/3d survey representations (Machado da Silva, 2018; Fernandes, 2016).

[15] In September 1975, all *roças* were nationalized. The land and the farmers were administered by the state of São Tomé during the process called *agrarian reform*. Despite being presented as against any colonial-based system, the organization of monoculture plantations inherited from colonial times was maintained into the 1980s, favoring just the cocoa production in detriment to other agricultural production (Berthet, 2012).

Besides low internationalisation, the studies disseminated so far offer little basis in a broader perspective for leveraging the cultural value embodied by these plantations and their related environmental transformations, especially for newcomers to these islands (tourists or new entrepreneurs). Multi-level narratives should be collected in order to understand the impact that past social segregation and large-scale exploitation has had on the contemporary multi-dimensional assets in STP, as well as on those in Portugal. Great effort should be directed toward presenting an integrated image as a tourist-destination[16] in a way that shares and re-tells the complex history of this country.

The purposes and the logics behind contemporary interventions around these heritage plantations are multiple and challenging. The preservation of the *roças* may be pursued by different means, yet all of these must consider the management of human trauma[17]. Changes of ownership or use (*e.g.,* when a *roça* is turned into a luxury hotel) inevitably suggests a critical statement about the involved stakeholders and their values.

The knowledge based on polyvocality and contextualized approach about those memories and views on past and present of the *roças* obtained from multiple stakeholders lay the basis for their critical value assessment and heritage actions. Along with other worldwide artefacts of controversial heritage,[18] the major challenge is to understand what and how can be proposed nowadays for this heritage today, trusting that "*The architect will always dream of purifying (..) uncontrolled violence, channeling obedient bodies along predictable paths, and occasionally along ramps that provide striking vistas, ritualizing the transgression of bodies in space*" (Tschumi, 1981).

Decolonization in practice

From Atlantic trade routes to decentring decolonization discourse

For over thirty years now, researchers have traced long-distance geo-historical itineraries of Atlantic trade in slaves and commodities.[19] In *Lugares de Memória da Escravatura e do tráfico*

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[16] See, *e.g.,* https://visitsaotomeprincipe.st/en/destination/. Other similar tropical tourist attractions areas the Caribbean since the 1960s, discussed by Cameron & Gatewood (2008).

[17] In intense monoculture plantations, even after the abolition of slavery, violence was an integral part of the management of indentured labor under a scientifically-based colonial system. In São Tomé and Príncipe, enforced labor-recruiting policies endured after the 1875 abolition of slavery. "*Those codes* [Portuguese colonial labor laws in 1875, 1878, and 1880] *adhered to the free labor market ideology, but in practice they legalized forced labor and colonial violence, in the form of five-year working contracts that sustained former dependence relations*" (Macedo, 2016:563).

[18] See, *e.g.,* Historiana (https://historiana.eu/historical-content/source-collections/cultural-heritage-controversial-buildings-and-their-changing-function), the Architecture of Violence by Eyal Weizman (https://www.aljazeera.com/program/rebel-architecture/2014/9/2/israel-the-architecture-of-violence), and Forensic Architecture (https://forensic-architecture.org/).

[19] "*UNESCO's Slave Route project: Resistance, Liberty, Heritage.*" The Portuguese cultural assets bearing direct or indirect traces of the slave trade that are registered on the World Heritage List include the Central Zone of the Town of Angra do Heroismo in the Azores (1983) and the Historic Centre of Oporto (1996).

negreiro[20], the format of which (in our view) recalls a tourist guide with a cover in blood-red, Isabel Castro Henriques examines four countries in the Atlantic and Indian Ocean (Angola, Cabo Verde, Guinee-Bissau, Mozambique, São Tomé and Príncipe) by interconnecting physical and symbolic footprints in territories of outstanding natural beauty and timeless enchantment. This cultural route and the relevant studies developed by Henriques are praiseworthy attempts to give shape to those "grey and empty" lessons of the History of Africa in Portugal in 1960s[21], unveiling stratified interactions of half-hidden traces (in Portugal, especially in Lisbon) and other controversial legacies in former Portuguese colonized countries. Her analyses of deep-rooted impacts of Portuguese colonialism in the world seek to counteract Eurocentric Enlightenment perspectives and biased forms of heritagization. To name an example, one of these unidirectional and institutionalized narratives was reaffirmed throughout the commemorative cycle organized by the *National Commission for the Commemoration of the Portuguese Discoveries* (in office from 1986 to 2002), whose influences can be grasped in the national education and cultural system, common mindsets, and international public debates[22]. This does not come as a surprise, since parallelisms to the presumed *exceptionality* of Portuguese colonisation (in *racial democracy* and the *civilized mission* promoted by Freire (1964)[23] can be found also in other former colonizer countries, such as in Italy. In fact, the stereotypes of Italian colonizers in Somalia and Eritrea as "*brava gente*" ("goodhearted people") still endures as a commonplace in Italian popular thought.

With the firm belief that the meaning of place is the basis for developing a fair society and preserving the identities of its communities, new knowledge on critical cultural legacies should be gained using a set of specific methods for decolonising purposes. Cultural and epistemic approaches should be combined in the effort to dismantle hegemonic cultural concepts and "strengthen decolonisation scholarship*"* (Smith, 2012). The need to articulate decolonized historical discourse vs *authorized heritage discourse* has recently arisen in social media campaigns. The debate on the decolonisation of museums, public space, and mindsets has only recently emerged in Portugal, where countless places showing remnants of these legacies can be found. Remarkable palaces in Lisbon (*e.g.,* Palácio Vale Flor) testify to the massive profit of companies and families where able to draw from the colonies, while other

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[20] "*Places of Memory of Slavery and the Slave Trade*" as a part of the initiative promoted by the *Portuguese Committee of UNESCO's Slave Route Project* housed in the University of Lisbon, Centre for Studies on Africa and on Development (Henriques, 2019).

[21] "*Em 1966 tive o meu primeiro contacto com África, depois de dois anos lectivos inscrita e frequentando o curso de História na Faculdade de Letras da Universidade de Lisboa, curso que me parecia cinzento e vazio [...]"*ENG: *"1966 I had my first contact with Africa, after two academic years enrolled and attending the History course at the Faculty of Literature of the University of Lisbon, a course that seemed gray and empty to me [...]"*(authors's translation)(Henriques, 2021:223). At international level, the colonial footprint of architecture schools is discussed in (Frankowski, 2020: 14).

[22] The question of how to concretely address this situation was raised at a March 2021 seminar in Lisbon, under the title *Descolonizar os museus...isto na prática*, (ENG: *Decolonize the museum...this is in practice*) (authors's translation), where the debate focused on the decolonizing practice in Portugal. Wayne Modest, director of Research Centre of Material Culture and subdirector of the Tropenmuseum in Amsterdam, discussed the semantic overhaul that will be implied by any such endeavor. Also taking part in this cultural event were Catarina Simão, Isabel Raposo Magalhães, Joacine Katar Moreira, Judite Primo, Luís Raposo, Manuel Santos and Paulo Costa (video and audio available: https://gi-imperios.org/blog/pt/descolonizar-os-museus-isto-na-pratica-2/).

[23] The 'civilising mission' in Portuguese colonialism from 1870 to 1930 is discussed by Jerónimo (2015).

public squares (*e.g., Rossio*, *Campo das Cebolas*, and *Jardim do Império*) silently echo colonial exploitation.

Decolonized discourse must still be supported by hands-on activities that can reach everyone. Transnational, intercultural and multiethnic communities should be the protagonists of a co-design process in rethinking the future of these cultural legacies and how these memories can be transmitted to the next generations. Calling on the audience to learn from past lessons in shaping the future of society, virtual environments and ubiquitous digital technologies expand the possibilities of future design scenarios.

New challenges are not limited to the mere application of emerging technologies. The question is how to correctly and comprehensively integrate epistemological and technological methods from different disciplines to build counter-narratives around the three intertwined pillars of critical heritage studies: history, memory, and identity.

Challenges in decolonizing the roças in STP: coexistence of multiple views and values

Delving into the specifics of architectural legacies and land transformations in former colonized countries, the process of critically reframing these histories with a forward-looking perspective will raise questions on both symbolic and practical levels. Admittedly, the built and landscape heritage can never be treated neutrally in view of the alteration, domestication, and instrumentalization that this heritage has undergone over the centuries. More than any other heritage category, shared legacies are never a static product of the past, and the past itself will continue to be contested (Smith, 2006, 2012).

Being able to take this vast and complex picture under consideration is an enormous challenge inherent in the necessary cultural overhaul. It means bringing together local and transnational communities, witnesses of colonial and post-colonial[24] issues. Policy-oriented organizations, entrepreneurs in agri-food systems and tourist sectors, civic associations, NGOs, and other critical stakeholders should together: (i) unfold narratives of colonial times and the post-independence era, unmasking historical biases and using a dialogic approach; (ii) identify impactful and sustainable design strategies for the reuse and valorization of remarkable cultural legacies. Even in contemporary times, the former narratives (i) have been hampered by the predominance of one-way European debates or dominant Western European perceptions of heritage.[25] Regarding (ii), the process of solution-oriented design has been delayed by structural factors such as multi-dimensional difficulties to deal with colonial histories and the effect of colonization upon the economy and the society (including ethnic divisions as argued in literature (Bertocchi & Canova, 2002), resignation, lack of foresight and dependence from white-ruled systems, and low cohesion between intentions and actions. To hand down these

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[24] Osterhammel introduces the notion of *colonialism* that exists even in absence of a colony. It is a process of dominance or systemic capitalism occurring within a society. In this line of thought, the term *post-colonialism* is controversial since this process is still underway and ubiquitous (Osterhammel, 2005).

[25] Smith recalls how it comes to light during the *World Heritage Convention* (WHC) in 1972 (Brumann & Gfeller, 2021; Modest & de Koning, 2016; AA.VV., 2008)

polyvocal narratives and lessons drawn from the past, cross-country analysis and knowledge-sharing are urgently required.

Future digital paths can be shaped by leveraging the great visual and symbolic impact of cultural legacies in STP which link Africa to Europe and the Americas. This requires analysis of: i) the multiple narratives and conflicting emotions awakened by heritage plantations; ii) the values to be promulgated in the digital age.

i) multiple narratives and conflicting emotions awakened by heritage plantations:

> *"(...) architecture has been instrumental in the installation and consolidation of settler-colonialism and the full spectrum of extractive, abusive, racist, capitalist, postimperial infrastructures of oppression. In the way that buildings are never just buildings, architecture is not a bubble.*
> *To address architecture is to engage with the multidimensional and material legacy of settler-colonialism, capitalism, and, as a direct result, racism."* (Frankowski, 2020: 4)

> *"In the face of pressing challenges, architecture would reject any form of apolitical approach to the* post-digital collage *as a purely aesthetical exercise, and would instead engage with the political content of images to generate collages with subversive potential."* (Frankowski, 2020:30)

Taking a broad view, conflicting viewpoints and narratives should be considered for leveraging this heritage to a post-digital level, where *post-digital collage* falls within the *hegemonic concepts* (under the category of *hegemonic theory*) as defined in *A Manual of Anti-Racist Architecture Education* (Frankowski, 2020). To pursue ecological justice, anti-colonialism, anti-imperialism, transformism, anti-ableism, and anti-racism, this manual/manifesto envisages forms around thirteen themes: means of production, ideology and buildings, contextual artifacts, post-colonial landscapes, inclusive urbanism, models of collaboration, critical moving images, inclusive still images, critical text, critical and inclusive rhetoric, heterodox drawing (against the Eurocentric-canon), collective world mapping, and reparations.

In a strikingly material way, shared heritage places epitomize not only hierarchical segregation, zoning, and human exploitation, but also economic imbalances, subjugation, and injustice, which sadly still influence the socio-economic milieu in the least developed countries (LDCs) as well as in Europe, as underlined by civic associations in London (British Black Panther Movement), Lisbon (Djass), to mention just a few. Van Roosmalen comments on how the value assessment of colonial architectures in Indonesia is similarly problematic: "*Architecture and town plans in themselves do not necessarily instil awareness and appreciation or lead to appropriation by a country's citizens or visitors. Appreciation and appropriation are even less common when the artefacts originate from a period of foreign domination, because they act as reminders of the period of foreign domination.*" (van Roosmalen, 2013).

In STP, architecture practitioners, historians, landscape painters, and travellers might appreciate the aesthetic value, the grandeur, the eclecticism, the authenticity in design, materials, constructions, morphological layout, and even the decadent beauty of the *roças*. Newcomers to STP may be impressed by the relevance of the *roças* to the territory as well as the construction quality of some architectural components (*e.g.,* wooden walkways, sinuous railings, ogival windows) visible on-site as well as captured by photographers and bloggers.

On the other hand, a vast gamut of emotions, such as anguish, odium, embarrassment, surprise, and curiosity may arise, especially when noticing the differences in the living conditions between the *casa-senhorial* and the *senzalas*, as well as in realizing the cruelty of the working conditions. In a process that demanded a huge number of workers, the cocoa beans had to be fermented, dried, cleaned, and packed – as visible in the great number of structures dedicated to the work (*armazéns* and *secadores*).

Beyond the evocative power experienced when viewing archival and current photographs,[26] one might have strong reactions when visiting artefact collections or exhibitions in memorial monuments or European ethnographic museums related to colonial histories[27].

Leaving aside any nostalgic attitudes or aesthetic views and turning to more pragmatic concerns, it should be noted that the recovery, use, and maintenance of *roças* are also hampered by relevant physical constraints (*e.g.*, size, type, location, surrounding conditions, and infrastructure connections), which can discourage investment especially by local agents and by diaspora ownerships.

To one who might be reluctant to work with these controversial legacies for these or other reasons, we respond that the physical traces of many *roças* may soon disappear, overtaken by the regrowth of the tropical forest or lost to the fate of neglect. The new generations who risk being deprived of this knowledge include Creoles (*forros*) – the descendants of African enslaved people and early white settlers – as well as Cape Verdean and Angolan inhabitants or any other communities historically attached to these places, including the Portuguese former settlers and their relatives (*retornados,* returnees)[28]. In other cases, refurbishment as tourism accommodations (*e.g., Hotel Roça Sundy*, in Príncipe) have similar undesired effects, such as

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[26] http://casacomum.org/ and http://memoria-africa.ua.pt/

[27] In Lisbon: *Padrão dos Descobrimentos* "Visões do Império" (2021);https://padraodosdescobrimentos.pt/evento/visoes-do-imperio/),"Retornar-Traços de Memória" (2015) https://galeriasmunicipais.pt/exposicoes/retornar-tracos-de-memoria/); Arquivo Histórico Ultramarino (2019) "*Colonizing Africa: Relatórios das Obras Públicas em Angola e Moçambique (1875-1975)*" (https://antt.dglab.gov.pt/exposicao-ahu-colonizando-africa-relatorios-das-obras-publicas-em-angola-e-mocambique-1875-1975/), "The worlds of (under)development: processes and legacies of the Portuguese colonial empire in a comparative perspective (1945-1975)" (2018-2022); Lagos City Council and Portuguese Committee of UNESCO's *Slave Route Project*, a slavery-themed exhibition (2016)(Santos, 2020).

[28] The group of workers from Angola and Cape Verde who arrived in the archipelago until the 1960s. Detailed analyses of relationships, hierarchies, and the co-existence of different ethnic groups are addressed by (Seibert, 2013; Nascimento, 2002), while critical questions related to Portuguese settlers and their families coming back in Portugal, so-called *retornados*, have been recently addressed by Peralta (2019).

the reiteration of the pattern of racial relations. Yet these plantations and their memories represent an alternative history to that taught or seen in European public squares and spaces, in academic courses on history and geography, in the museum collections and expositions.

ii) values to be promulgated in the digital age:

> *"Heritage places serve as a threshold of collective memory of shared ideas that are constantly renewed with an opening in looking to the future. This process is supported and questioned by a myriad of individual memories, experiences and wishes, hence underscoring the idea of openness, diversity, historical heterogeneity and social interactions as sources of place meaning".* (Gantois, 2021)

The narratives to be imparted should encompass a value-sensitive design (VSD) approach – that is, they should be based on a set of values relevant for the critical stakeholders called to give witness to each history. By using a VSD approach, we can address challenges to human values at the intersection of multiple perspectives and respect the core ethical values of direct and indirect critical stakeholders. The set of values of critical stakeholders should be incorporated into the design of the architectural solutions (AA.VV., 2015). In line with Schrijver's (2015) thought we must keep in mind that *roças*, as architectural artefacts whose spatial layout was drawn for a specific purpose, incorporate values that have changed over time. Buildings and settlements are often designed and inhabited over long-term periods during which values can also change. Any interventions should reflect the multiple new values of the new inhabitants and people experiencing these heritage places today.

These multiple narratives cannot fail to omit historiographical (re)readings related to colonialism and the post-independence phase (1975 to present) to overcome the limitations of contextless architectural narrations. Delving into the reports of day-to-day life, each *roça* has its history in the *process of acculturation* undergone by both European employers and the African enslaved (or forced) workers[29]. Heritage contextualization and transparency in history make it possible to show not just the plantation heritage but also its points of intersection with local cultural expression (*e.g.*, art, dance, theater), while the inclusiveness is considering in reshaping the future enriched from an historically aware perspective. This wider perspective should hope to escape falling back into a reductionist vision that elides the affirmation of African communities and their cultural resistance.

Potential digital technologies applied to shared cultural heritage

Multi-format representations

Digital technologies have proven their effectiveness for learning purposes in a variety of disciplines, notably in medicine and engineering, as well as in history, cultural anthropology,

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[29] *"Not all Roças would be oppressive, nor would all human relations would be guided by strict racism or a strong personal subjection. However, in many cases there would not be much room for the manifestation of individual subjectivities and attitudes contrary to the dominant tone imposed by economic pressures and political circumstances"*(Nascimento, 2002:401)

and architecture, including the Architecture and Engineering curricula (Eloy et al., 2016). Multi-technology simulation, such as augmented reality (AR) and virtual reality (VR), have been often used for infotainment and dissemination purposes within multiple cultural heritage domains[30]. AR superimposes virtual objects on the real world in order to immerse the user into new informed-enhanced realities, whereas VR delivers complete off-site simulations of the world through immersive computer simulation. AR guarantees non-intrusive interaction with the physical world, having been used to improve user engagement, foster inclusive social learning, and introduce new ludic ways of exploring cultural heritage. Serious games and gamification strategies are used to engage people in emotion-evoking activities, promoting relationships and motivation (Khan et al., 2020). These tools improve social learning and lead to novel ludic approaches to cultural heritage exploration. Architecture and cultural heritage awareness games either offer an immersive experience for learning the values of cultural heritage sites or seek to persuade users into the real experience. Tan and Lim have developed an AR walkthrough tool for learning about tangible cultural heritage, while Vera and Sanchez use AR to enable users to create digital content about their surroundings. Basaraba presents a tool to co-construct cultural heritage-related experience through a web-based interactive digital narrative, while Vayanou *et al.* deliver a storytelling game in which promising performative cultural experiences are designed (Khan et al., 2020; Vayanou et al., 2019; Basaraba, 2018; Tan & Lim, 2017; Vera & Sánchez, 2016).

Core dichotomies in cultural heritage experiences with advanced technologies

For several years already, curators have used AR/VR tools to enrich cultural exhibitions worldwide by integrating data on physical artefacts or texts. However, a recent survey shows that few such examples can be found in Europe (ICOM, 2021; UNESCO, 2003, 2020). If they are to be deployed, these forward-thinking cultural services must adapt to some institutional rules as well as to venue constraints. In the near future, the forced closures caused by the pandemic – as well as the economic slowdown – will induce all collections to strive to differentiate the cultural service they provide and to reach diverse audiences with web-based technologies.

The dissemination of shared cultural heritage using digital technologies is a complex task primarily due to the problematic value assessment of the type of heritage (as previously shown in STP, *section 3.2*). In analyzing the permanent exposition in Lagos entitled *Núcleo Museológico Rota da Escravatura*,[31] Santos (2020) raises relevant questions which can be generalized within critical heritage studies around three core dichotomies: i) playfulness of presentation *vs* the seriousness of the issue; ii) the potential of integrating contents by means

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[30] VR and AR have proven their effectiveness in e-learning contexts due to their capacity to immerse and engage. AR enables a synchronic interaction with reality in which both past and present information can be shared and experience, as shown *e.g.,* in SeeArch (Raposo *et al.* 2017). In a similar way, VR enables the experience of a full or semi-simulated multisensory world in which a participatory, co-created experience can be offered, as shown *e.g.,* in MyChanges (Eloy *et al.* 2021).

[31] Hosted in the *Mercados de Escravos* (slave market) building and inaugurated in 2016, this collection was conceived after the discovery of the enslaved Africans in one of the oldest of these burial sites in Europe.

of digital technologies *vs* the intentional obscuring of micro-narratives or different perspectives of the same historical event; iii) scientificity *vs* a more human approach.

Looking at this exposition in more detail, it uses advanced digital devices to display the remains of 158 enslaved Africans found in Vale da Gafaria. Multimedia contents in modern displays for electronic notebooks and AR glasses provide a wealth of information about printed maps and other exposed artefacts. Visitors can also use their smartphones to access AR apps if they are present at the museum. As explained by Santos, the enslaved Africans are represented by a group of black monoliths with electronic displays, while the entire exposition requires bodily interaction, which helps capture the interest especially of children and groups. All its texts are translated into English since Lagos is a common international tourism destination.

Despite this gesture toward internationalization, a whitewashed perspective remains embedded in the contents of the exhibition, as Santos underlines: "*this museum-like space refers to the slave trade only as early globalization and multicultural dialogue*" and "*Both forms of visual display and of written text turn these enslaved Africans, the first to have died on European soil, into invisible victims of the Portuguese state and its slave traders: they are visible only as depersonalized osteological pieces, rendered as scientific and archeological finds*."(Santos, 2020).

The above-mentioned core dichotomies should be carefully considered in the technological design process for cultural heritage experiences around the plantation heritage in STP. These pitfalls are as dangerous as those derived from the global digital divide, the duality between high tech *vs* low-tech-based technologies in the Global North and least developed countries (LDCs). In line with Kituyi's thought*,* Africans should "*take part in the new digital world, not just as users and consumers, but also as producers, exporters and innovators, for creating and capturing more value on their path towards sustainable development*" (UNCTAD, 2019).

New insight on the past, present, and future of this shared heritage can thus also address the risk of digital space reiterating certain forms of social exclusion or even a new form of colonization, understood as cultural or economical hegemony upon the community of a given country.

New frontiers of shared digital technologies in education about architecture and avenues of inquiry
Politically engaged research can be addressed in new shared digital infrastructures to overcome polarized perspectives through democratic processes in education, training policies, and governance. Given the fact that the education offered by architecture schools has tightened and materialized non-egalitarian systems: *"[a]n Anti-Racist pedagogy across the world is only possible through decolonization processes and reparations that address the colonial footprint of Architecture schools."* (WAI, 2020: 14).

We note that, using advanced digital technologies, unprecedented pathways can be opened to provoke a great deal of new thinking about architectural and land planning, history, human

geography, and cultural anthropology – this includes e-learning tools, walkthroughs, AR for real locations, or other multisensory artworks. Multiformat representations in different learning spaces can overcome the disjunction between the physical space and multiple (often silenced) narratives: the distance between material culture legacies and the meanings and values behind their form. Collective imaginaries can be shaped towards a global cultural overhaul, in which the reframing of material legacies can support systemic decolonization.

Bearing in mind that younger generations (for instance students) tend to be at ease with interactive and multisensory content, the combination of digital technologies with co-learning processes has the potential to drive active and transformative learning, which may in turn influence architectural planning and design, as well as behavioral patterns such as staffing patterns, and greater sense of acceptance, inclusion, identity, and security.

Context-based learning about controversial heritage or negative histories from across Europe are being developed under the *Historiana* initiative[32]. Students and critical stakeholders can share information, standpoints, beliefs, doubts, and ideas via free on-line access, discovering different perspectives on the places where they live. Among a large variety of selections of historical content, the website *Historiana* includes *Cultural Heritage: controversial buildings and their changing function*, a source collection that displays a range of monuments or memorials in Europe with a brief textual description and photo, part of the *Learning to Disagree* project. These are integrated with activities for classroom practice.[33]

Another important aspect is that a vast spectrum of digital tools can be designed using the architectural legacies of STP as a living source of learning, but these should remain complementary to any real on-site experience. Choosing a bottom-up approach across the new digital pathways will make it possible to design earning experiences that are inclusive, self-guided (or stand-alone interpretive), collaborative, and more democratic. This living source has the potential to bring together a large potential audience beyond Afro-descendants, including migrants from STP living in Europe. The user can view local and global sites, sharing this experience on social platforms, even without travelling to the actual site in person. Although the virtual experience can hardly replace the intensity and authenticity of an in-person experience, the digital tools are inclusive and easily accessible. This aspect is particularly relevant in the post-COVID-19 world, since real experiences may be precluded by lockdown measures, as well as due to the cost of flights.

The impact of the European colonisation upon human and environmental dimensions in colonized countries cannot be compartmentalized into separate domains of knowledge,

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[32] Cohort-based activities are designed and shared on the *Historiana* platform (https://historiana.eu/), part of the *Europeana Creative* project. The development is financially supported by the European Union and the Evens Foundation, the historical content teams and EUROCLIO trainees. Interesting examples are available at: https://historiana.eu/teaching-learning. Teacher material (lesson introductions, lesson texts, lesson plans) and student material (worksheets) are provided for a number of historical themes and situated contexts.

[33] https://historiana.eu/historical-content/source-collections/cultural-heritage-controversial-buildings-and-their-changing-function

packaged for each academic discipline. Nevertheless, with a focus on students of architecture and the community interested in cultural heritage, the approach to the *roças* and their surroundings can be addressed along multiple avenues of inquiry –especially geography, architecture, and social studies – integrating different databases, tools, and multi-format sources. This information can be combined to shape new textual and visual readings, inspiring students of architecture to innovate discourses and media outside of the institutionally perceived boundaries of architecture (Frankowski, 2020: 44). Recent digital technologies, labelled as *interpretive technologies*, foresee several solutions that satisfy these requirements to guarantee a holistic approach and expand access beyond any geographic boundaries (Heritage Lottery Fund, 2012).

Some priorities for the design of e-learning tools and their application in STP are outlined below:

i)   *incorporate information reflecting multiple perspectives:* It is important to bear in mind the dichotomies and conflicting perspectives that should be debated and shared. The cultural plurality of displaced people and agents involved in colonial and postcolonial societies should be expressed via the close collaboration and debate throughout the whole critical design process. This process should also involve representatives of cultural institutions (including within academia), ICT (Information and communications technology) developers, critical stakeholders (communities of STP, Afro-Europeans, and *retornados*), activist groups, and civic associations. Beyond the application of method for value-sensitive design, this requirement can be met using contemporary crowdsource technology that enables large communities to participate in the creation of common platforms for knowledge (*e.g.,* Wikipedia).

ii)   *enable diachronic and synchronic studies:* Several advanced tools, such as Machine Learning (ML), offer new opportunities to address diachronic and cross-sectorial analysis (Chen et al., 2021). Comprehensive analysis of digitised historical maps of STP can demonstrate the huge territorial alterations across different historical phases, monitoring their temporal evolution. Deforestation has been the most salient transformation of the landscape, having been pursued for planting crops, for constructing the railways, for fuelwood consumption; wood is also largely employed for constructing local houses. Visual comparison and more detailed studies can be addressed in STP using digital documents of postcards, photos, and newspaper journals[34]. Additionally, GIS and Space Syntax analysis make it possible to explore the sociocultural dimension embedded in spatial systems over time and

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[34] This information can be retrieved from *e.g.,* historic presidential trips, and digital libraries portraying historical memories of STP for public access (even if metadata are in Portuguese): *Memórias de África e do Oriente*, developed by researchers from the University of Aveiro and the Center for Studies on Africa and Development (since 1997) to share documents from different archives (including those from *Arquivo Histórico de S. Tomé e Príncipe*), and *Casa Comum* organized within *Fundação Mário Soares e Maria Barroso* (since 2006). In *Casa Comum*, in addition to general and advanced search, the user can browse the documents using a classification tree and retrieve contextual elements to visualize the records and related meta-data organized into document series that, whenever possible, reflect the original order of their producer(s).

across different uses. The key advantage of these analyses is the ability to combinate tangible and intangible aspects of the physical space towards the identification of patterns of the use of space in different cultural periods (Palaiologou & Griffiths, 2019).

The use of layers of virtual information via AV and VR or mixed-reality tools make it possible to depict changes in the characteristics and valuation of real environments over time. These tools should leverage multisensorial descriptors to facilitate the interaction between users and the complex realities in STP.

A crucial aspect toward a broader new perspective is taking stock of local emotions and of insightful interpretations of existing cultural data, be these in physical contexts (in proximity to the heritage site) or in digital ones (archival collections or other repositories). Micro-narratives of descendants of who worked at, inhabited, and escaped from the *roças* could be made digitally available in resonance with heritage sites as if they were digital twins. We use the expression digital twins to indicate the virtual narration of memories to enrich the physical space, experienced simultaneously and commented as the place is perceived by our sensory receptors.

iii)   *be inclusive:* The type of information, its mode of representation (visual, textual, audio), the form of human-computer interaction, and the lexical choice[35] are all fundamental factors influencing the design process for inclusive e-learning activities as well as any digital cultural product, whether this be a web-learning tool, app with AV/VR experience in a museum collection or cultural exhibition, serious game, etc.

To develop inclusive tools, it is necessary to understand the varying levels of skill, background, interest, education, and abilities of each group of end-users and their ecosystem (Vosloo, 2018). The power of visual language is not to be discounted. In STP as well as in other least developed countries, inclusiveness means providing translated contents in multilingual platforms (*e.g.,* Wikipedia), assuming an open science approach, making content also available on low-tech devices (*e.g.,* google card box for VR instead of an expensive Head Mounted Display) and low speed wi-fi connections (*e.g.,* avoiding the sharing of large amounts of data, using the cloud), so that diverse learning pathways are available for users of different ages, interests, and familiarity with technologies.

Concluding remarks

The digital transformation has not yet greatly influenced the heritage preservation practices in least developed countries. Heritage practice involves critically rethinking of the meaning of shared cultural heritage, arising from past European colonization, and rethinking potential reuse by a large community with consideration of cross-sectorial politics. Problems related to

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[35] Commercial rendering and other hegemonic forms are shown in *A Manual of Anti-Racist Architecture Education* (Frankowski, 2020). Conceptual and semantic decolonization practices are addressed in literature. Here, we just refer to the recent work of Wayne Modest (see footnote 22) https://www.tropenmuseum.nl/en/about-tropenmuseum/words-matter-publication.

the use of a set of advanced technologies, the involvement of different stakeholders, and the coexistence of conflicting values emphasize the importance of adopting a decolonizing perspective.

Embodying both memories of violence and promises for future development, the *roças* in São Tomé and Príncipe testify to conflicting and fluctuating values around both post-coloniality, with diverging prospects for their reuse. Although the exploitation of tropical commodities and racial inequalities remain persistent themes in the history of STP, these difficulties have not crushed the cheerful and welcoming spirit of these communities, in which the visitor is made to feel: *"Afinal, chegamos a África, e sentimos que o que não nos corre nas veias, entranha-se na alma."*[36]

Critical reflections for effective actions are urgently required in STP, since the intergenerational transmission of colonial history is truly at threat. Moreover, most of the *roças* have been abandoned, inappropriately occupied, or turned into luxury hotels that echo racial segregation. The preservation and adaptive reuse of *roças* should encompass multi-dimensional approaches for unmasking and reacting to those overarching racial inequalities that have been fostered by Eurocentric policies.

Although there are no infallible recipes for intervention, and while certain contextual constraints may seem insurmountable, these cultural legacies have the potential to be conceived as living sources for learning, to give voice to untold yet irreplaceable narratives. Despite the real difficulties arising from the growth of the Global North/South divide, especially with the COVID-19 pandemic, and the need to face health/economic emergencies in STP, this architectural and environmental heritage harbours promise for a more inclusive and aware transnational society.

In the digital age, constructive action toward the re-thinking of cultural legacies and the improvement of learning spaces offers countless perspectives. In handing down lessons drawn from the past to new generations, these e-learning tools can raise awareness of the current state of uncontrolled development and careless usage, hopefully preventing the material loss of cultural legacies secured by the sacrifice of countless multi-ethnic workers and families.

Historical frameworks can be rethought using digital means in approaching marginalized ethnic groups whose roots are entangled in colonial histories. Their patterns of distribution and the public representations of their identity and culture worldwide reflect stereotypes, biases, and racial inequalities – a situation echoed by the historical narratives around plantation work in STP and Atlantic slave routes. Advanced digital technologies have the potential to reconnect this part of history to contemporary European places, to provide engaging and non-stereotyped access to the heritage, and to inform more just, sustainable, and historically-aware viewpoints. E-learning that is dedicated to providing an interactive diachronic overview of the architectural

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[36] *"Finally, we arrived in Africa, and we feel that what doesn't run in our veins, enters our soul"* (ABVP-Associação de Bloggers de Viagens Portugueses, 2020)

and planning dimension represents a promising new frontier, one that seeks to shed light on the past and on the (variable) cultural values presently embodied in physical space (both colonial heritage places and memorial markers). In fact, e-learning tools can counteract 'collective amnesia' or the recurrence of internalized racism, while greater awareness can inform the tourist's choice of destination and their experience. Other exploratory pathways may address perceptions triggered by the built and natural environment in STP in a way that overcomes the rigid, backward-looking focus on colonial roots, by which people's views may become stereotyped or immobilized over time.

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