



When Ideas Migrate: Postcolonial Perspectives on *Biomodd [LBA²]*

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Abstract

Biomodd is a global series of art installations in which computer technology and ecology converge. Computer networks built from upcycled computer components are provided with living internal ecosystems. In a symbiotic exchange, plants and algae live alongside electronics and use the latter's waste heat to thrive. Sensors and robotics provide additional interaction possibilities with the organisms. The first version of the project was completed in the US, while the second version was built in the Philippines. Using a postcolonial stance, we reflect on the challenges involved in translating the project from one context to another. We focus on issues related to heat recycling in the tropics; authenticity and hybridity; obsolescence and the convertibility of capital; cultural sampling, remixing, and appropriation; and structures for social organization. We advance Biomodd as a significant contribution to art-science collaborative initiatives in the global South.

Keywords

Postcolonial computing, installation art, collaboration, ICT4D, HCI4D, digital games, e-waste, recycling, gaming, ecology, biological art

Introduction

Many practices of contemporary art have wandered into and set up shop in territories traditionally held by science, and vice versa. [1] This crossover between art and science seems particularly noticeable to those of us who live in what media theorist Rolando Tolentino has termed "advanced capitalist countries", in which intellectual practices and concerns in scientific and artistic disciplines have experienced particular shifts and turns. [2, p. 101] However, a review of the literature on why science matters in so-called 'global South' countries (like the Philippines, from where we are currently writing this paper) reveals that questions of existential philosophy or aesthetics hardly figure. Instead, issues that do appear to matter – and for which the study of pure and applied sciences is encouraged – include improving food security, achieving better mater-

nal health outcomes, preventing the spread of communicable diseases, and addressing other challenges articulated in texts such as the United Nations Millennium Development Goals. [3] In response to these socio-economic challenges, perspectives on information and communication technologies for development (ICT4D) and human-computer interaction for development (HCI4D) have been advanced within computing science. [4] While such perspectives are interdisciplinary and do draw from the arts, much work could be done to advance the intersectionality of the arts and the sciences and their role in addressing the diverse range of issues particularly in the "imperialized formations" of the global South. [2, p. 101]

For instance, art-science collaborations matter in addressing the global challenge of fostering what might be thought of as a *critical awareness of connectedness*. By this we mean a shared understanding of how the flourishing of human societies relies on our interaction with the natural ecosystems on which we depend, and on a critical engagement with the artificial systems that we create. This includes an acknowledgement and understanding of the fact that social, natural and artificial systems are continuously impacting on and reshaping each other. These dependencies and interactions have underpinned a diverse and burgeoning corpus of artistic and design work that has emerged over the years, marked by an interest in imagining a new "ecology of relations" through interfaces and systems that link humans, organic materials, and machines. [5] For instance, *The Telegarden* features a robot arm that tends to a garden and which human participants can remotely control. [6] *Mussels control lights and sounds* in Natalie Jeremijenko's *MUSSELxCHOIR*. [7] *Biolesce* uses electric motors to agitate algae that luminesce in response to the heart rate of audience members. [8] *Legend of the Sea Lord* uses mobile technologies to deliver a "mythological spectacle" and parable on the impact of human activity on marine ecosystems. [9] In each of these cases, the artists have responded to the invitation to address critical awareness of connectedness through poetic and technology-led forms of interventions.



Figure 1. Biomodd installations. From left to right: Biomodd [ATH¹] (Ohio, USA, 2008); Biomodd [LBA²] (Los Baños and Manila, Philippines, 2009); Biomodd Maribor (Maribor, Slovenia, 2010); Biomodd [NYC⁴] (New York, USA, 2012). Images used with permission.

In this paper, we present our attempt to find a shared space for inquiry and practice between contemporary arts and sciences in a postcolonial, global South context. In particular, we reflect on how we navigated problematic engagements during a process of reimagining and reinterpreting an interactive, new media art work that was originally designed in US and led by a Belgian artist/scientist – titled *Biomodd [ATH¹]* – in the context of the particular social, cultural, and economic conditions of the Philippines. The result of this translation we titled *Biomodd [LBA²]*. (For brevity, we abbreviate these two projects as *ATH¹* and *LBA²*, respectively.)

ATH¹ and *LBA²* are both part of *Biomodd* (www.biomodd.net), a global, collaborative, cross-cultural platform that brings together these various threads of artistic praxis into an integrated artistic work through interdisciplinary collaborations between artists, scientists, and other social change-makers. While *Biomodd* has been discussed in relation to climate change adaption and to education, we have as yet not teased out what we feel are the most salient cultural themes that have figured in the process of carrying out the project. [10], [11] This paper aims to address that gap.

Postcolonial critique and new media art

To frame our reflections, we refer in part to Irani et al’s discussion of “postcolonial computing”, which they define not as a new way of doing things, but “an alternative sensibility to the process of design and analysis” of digital products. [12] The term was advanced in the context of the application of HCI and human-centred design to a growing range of complex global problems, including “technological cultures, digital divides, multiple stakeholders, [and] economic disparities”:

We take as our starting point a move from “development” discourse to postcolonial discourse – that is, a discourse centered on the questions of power, authority, legitimacy, participation, and intelligibility in the con-

texts of cultural encounter, particularly in the context of contemporary globalization. [12]

Postcolonial critique of digital media and the electronic arts first surfaced in the late 1990s but then disappeared from the technology and computing design discourse until its resurgence a decade later. [13] We aim to contribute to the thickening of *postcolonial discourse in interactive art and technology design* by using the lens of postcolonial computing to retrospect on *LBA²*.

Biomodd Themes and Approaches

Biomodd reimagines and integrates relationships between social, natural, and artificial systems. The project was initiated by the second author of this paper in 2007 and has been undertaken in collaboration with various groups and individuals in the USA, Philippines, Slovenia, Belgium, the Netherlands, New Zealand, Chile, and the UK. [14] Figure 1 shows some of the different *Biomodd* versions. While the project does not solely aim to create a singular art object, like many other process-oriented projects, *Biomodd* projects nevertheless coalesce into physical structures that have been shown in exhibition contexts, whereupon the installation stands as a material testament to the dialogues, negotiations, and other exchanges underpinning the work.

Biomodd is predicated on a range of concerns that, taken together, form a conceptual framework.

Case modding and hardware hacking: *Biomodd*’s name is derived from the practice of *case modding*, the practice of transforming computer cases into imaginative structures. [15] *Biomodd* is inspired by the codes and techniques in the case modding subculture.

E-waste and its creative reuse: Obsolete hardware is reused in *Biomodd* functionally and visually. As we discuss in the next section, the difference between obsolescence in the industrialized West and in the global South presented a number of challenges in *LBA²*.

Symbiosis between electronic and biological systems: *Biomodd* installations bring biological life in proximity with electronic hardware, and provide mechanisms for the two systems to communicate with each other through meaningful symbiotic relationships.

Open sourcing: *Biomodd* encourages the use of open source operating systems and software applications in order to extend the modification potential for the artwork as far as possible. In return, online guides have been produced that allow anyone interested to build their own version of the *Biomodd* installation.

Digital games and gaming culture: *Biomodd* installations can function as multi-player gaming environments. Games are either modified open source games or, as in the case of *LBA*², developed from the ground up by team members.

Recycling: After showcasing the project, the team that built the piece dismantles it and adopts the various components, or else recycles them in thrift stores, recycling centres, and institutions that might find use for the materials.

Juxtaposing the local and the global: Selected parts of previous versions are integrated into subsequent versions, which are built with different collaborators and new materials, but with the original concept reinterpreted according to local cultural and social conditions. In this way, *Biomodd* echoes Irani et al's observation that "technology travels ... around the world in projects of design and development". [12] However, as we discuss in this paper, this goal of juxtaposition creates tensions due to conflicting histories, value systems, and narratives.

From Ohio to Los Baños: The *Biomodd* migration

As mentioned, the first *Biomodd* version, *Biomodd [ATH]*¹, was designed in Athens, Ohio in the US in 2007-2008. The second version, *Biomodd [LBA]*², was completed in Los Baños, Laguna in the Philippines in 2009. *LBA*² was largely patterned after *ATH*¹. The social, cultural, and economic contexts of these two sites are widely different and resulted



Figure 2. The *Biomodd [ATH]*¹ installation

in outcomes that we feel reflect these differences. To discuss *LBA*² sufficiently, we first describe *ATH*¹.

Led by this paper's second author, *ATH*¹ was designed by a group of artists, scientists, and social change makers, and developed in the USA as part of an artist residency at The Aesthetic Technologies Lab at Ohio University in Athens, Ohio between September 2007 and January 2008. Around nineteen collaborators contributed to the project, which initially began without "a specific detailed design in mind"; and was instead left open as an open-ended concept of translating "social heat" into "computer heat" and then finally into "life-sustaining heat":

*Biomodd [ATH]*¹ reflects our attitude towards technology: never satisfied with the status quo, machines are endlessly evolved, systems are boosted and performance gets violently pushed. Overclocking of computer processors becomes a metaphor of contemporary society; a society fascinated by growth and productivity but at the same time generating massive amounts of excess heat. [16]

The material outcome of the process was a living sculpture that functions as a social gaming station. Figure 2 shows the completed *ATH*¹ installation, which featured the following components and subsystems:

- A metal frame covered with acrylic panels that contains exposed computer components and various plants;
- A networked system of five upcycled computers running a Linux distribution; the different computer parts are visible and mounted throughout the case;
- A multiplayer computer game that runs on the networked computers;
- A liquid cooling system that used a green algae culture as coolant liquid and stored in a large glass aquarium;
- A second aquarium – inhabited by goldfish – that was used to cool the algae coolant liquid; and
- Living plants housed within the case and whose growth was enhanced by the heat produced by the computer

Like *ATH*¹, *LBA*² emerged out of a formal engagement between this paper's second author and with a university, namely the UP Open University in Los Baños. We co-led *LBA*², with the first author acting as the second author's local counterpart in the project. *LBA*² heavily built further upon the design that was established during *ATH*¹. We initially aimed to use the same approach as in *ATH*¹, starting with a standardized conceptual framework without strict guidelines on how to formally interpret that framework. To facilitate the process, we offered the team the idea of interpreting the *ATH*¹ system using local materials and aesthetic vernaculars, but only as a point of departure. However, a variety of contingencies forced the team to transform what was originally an exploratory design exercise into a blueprint for the final installation. These contin-



Figure 3. The Biomodd [LBA²] installation

gencies relate to real complexities around funding, space, temporality, collaboration, collegiality, authority, and power. For reasons of space, we postpone further discussion on these contingencies, though we have previously covered some of the relevant issues in an examination of LBA² as a platform for teaching and learning new media art. [11], [17] For now, we note that the team felt that they augmented the initial design to such an extent that they preferred to keep it in the final presentation. These augmentations centered on the multiplayer game, an embedded aquaponic system, environmental sensing, and the use of traditional woodcarvings.

In this section we focus on five aspects of the LBA² project that deserve analysis in the context of the postcolonial. We begin the discussion of each aspect with a discussion of material aspects of the installations. We believe that the political is embedded in the material. [18] Reflecting on the material differences between the two versions provides us a platform to unpack five issues: appropriate metaphors for heat in the tropics; colonization, authenticity, and hybridity; defining e-waste and leveraging the convertibility of capital; sampling, appropriating, and remixing; and the rhizome and the tree as metaphors for social organization.

Appropriate metaphors for heat in the tropics

One of the significant challenges we faced was reinterpreting in fact the central idea from *ATH¹* of the creative transforming and upcycling of waste heat. In temperate climates where excess heat generated by machines can be effectively used to keep spaces more liveable or productive (as with greenhouses), similarly generated excess heat in already

hot tropical climates is extraneous and near useless. That technological solutions cannot simply be ported over from one context to another is well established, at least in other fields of science and technology such as agriculture and architecture. [19] Irani et al's observations on *appropriate technology* strikes close to the problem: "Many such well-intentioned efforts to 'migrate' technologies from industrialized contexts to other parts of the world have foundered ... on social, cultural, political, or economic assumptions that do not hold." [12] In the case of the migration of Biomodd to Los Banos, the assumption was an environmental one.

The solution we settled on was brought forward by one of the team members who happened to specialize in aquaponics – the practice of recirculating water from aquaculture tanks to a hydroponic system. [20] The warm fertilized fish tank water in LBA² was used to irrigate a vertical system of hydroponically grown plants inside the case. This elegantly closed the conceptual and thermodynamic loop: if people were using the game more intensively the computers would heat up more. As a consequence the algae culture would also heat up and dissipate more heat to the fish tank. The increased temperature of the fish tank consequently increased the fish's metabolism creating more nutrients for the plants in the vertical hydroponics system. Playing boosted growth.

Colonization, authenticity, and hybridity

In *ATH¹*, the processor of the server of the network was cooled using a water-cooling setup. But instead of commercial coolant liquid, we used a living culture of single-cell *Chlorella* algae. The warm algae culture was subsequently cooled using a simple heat exchanger. The warm algae were pumped through a submerged spiral in a fish tank. In this way the heat dissipated in the fish tank.

The algae's provenance is relevant. Originally sourced from Belgium, the algae was dried and revived in the US during *ATH¹*. *Chlorella* is known to exhibit a high tolerance to desiccation through the formation of spores. [21] Moreover, *Chlorella* algae are so-called bioaerosols and can be carried along through the air. [22] As a consequence, "American" algae "contaminated" the "Belgian" algae, which were cultured in a non-sterile, open environment during *ATH¹*. We repeated the process in LBA² and cultured the *ATH¹* algae – an American/Belgian hybrid – with the expectation that the local Philippine variant would infect the *ATH¹* algae mix.

During a talk that we gave in the Philippines, the concept of mixing algae spurred some discussion with the audience. "Why not use a purely local species?" we were asked. There was a criticality to the question. It carried weight. After all, as a poetic act, the notion of one algae strain "infecting" or "contaminating" another is a powerful. But as a political act, it raises question about cultural integration. Was the audience member's question a veiled expression of xenophobia? Perhaps, but it is well worth stressing that the Philippines is a postcolonial state that has only relatively recently emerged out of over a combined

425 years of Spanish, then American, rule. It has been well documented, in fact, that the United States “sought to make over the Filipinos into little brown Americans”. [23] Around the time *LBA*² was initiated in the Philippines, the nation was (and to this day still continues to be) engaged across multiple scales in dynamic processes of cultural and personal *identification* characterized by an inclination towards an “imagined community” that could be seen to transcend precolonial identities. [24], [25] As historian Fernando Zialcita has observed, “many Filipinos question the ‘authenticity’ of their identity... [They] are uneasy about the heavy Spanish influence that came in with colonialism... [and] wonder if their culture is a mixture of conflicting traditions.” [25] Little wonder, then, that the provenance and metaphoric signification of the algae provoked questions.

But if there is uneasiness about hybridity and absence of authenticity in some quarters, an opposite sensibility – one that celebrates the mutability of identity and the possibility of a global cosmopolitanism – characterizes other areas of the Philippine experience. [26] Seen in this light, *Biomodd*’s deliberate hybridization of *Chlorella* could be seen as desirable. It resonates with Irani et al’s reminder of the instability of geographical or physical distinctions when demarcating the boundaries of culture. [12]

Defining e-waste and leveraging the convertibility of capital

Biomodd attempts to engage with the problems posed by electronic waste (e-waste). *ATH*¹ featured a networked system made of computer components – motherboards, hard drives, optical drives, CRT monitors – that had previously been discarded and regarded as obsolete. Team members assembled these components into fully functional computers by identifying usable or repairable components and maximizing their functionalities – for instance, by maximizing random access memory (RAM) use – and by installing lightweight operating systems. In addition to reusing computer components functionally, the team also used e-waste as architectural elements in the installation based on what Kim and Paulos have identified as the *material*, *shape*, and *operation* properties of e-waste. [27]

Functionally and visually, e-waste was used in similar ways in *LBA*² as in *ATH*¹. However, the process by which we acquired the e-waste differed drastically between the two contexts. Technological obsolescence is different in the US than in the Philippines. This was highlighted in an extended search we conducted for discarded Pentium 4 motherboards – a difficult task since at the time we were working on *LBA*², most offices and homes in the Philippines were not willing to part even with Pentium 2 computers. (Our request for such powerful computers was met with visible amusement by the manager of a local recycling plant!) A discussion arose within the team about whether we should work with and hack what was readily available. In the end, we decided to stick with the original minimum specifications, as we believed that hacking older

computers required technical skill, which would be harder to find than Pentium 4s.

Decisions such as these highlight the types of trade-offs and *conversions* that we had to make in sourcing material, labour, and other forms of capital. (Our use of the term ‘capital’ is based on Bourdieu’s notion of forms and convertibility of capital and Talisayon’s typologies of intangible assets. [28], [29]) Since we had little by way of *structural* capital (sufficiently powerful but somehow also obsolete computers) or *human* capital (skilled programmers who could hack the old computers that were readily available), we turned to our *social* capital. The team held a public event where we invited friends and family and colleagues (and their friends and family) to come and donate their old computers to the *Biomodd* team.

Indeed, our reliance on converting one form of capital into another extended to a bewildering array of activities, from barbecuing donated hotdogs, and selling cocktails created with cases of donated vodka at parties; to convincing people at social events to drop the equivalent of 50 US cents in a “*Biomodd* bowl” for the opportunity to have their photography posted on the *Biomodd* website. We crowd-funded in real crowds. After two failed grant applications (a failure to secure *financial* capital) and an initial level of disinterest from major art spaces in providing *infrastructural* support, we realized that building our social capital was the most viable way to keep the project growing. Over the course of about six months, we grew the *Biomodd* team to the point where we had about 10 core team members, about 40 occasional team members, and over 70 people on the team mailing list. The final roster of *Biomodd* was immense and featured supporters from academia, the non-profit sector, industry, private individuals, the arts, and the sciences. The convertibility of tangible and intangible forms of capital is crucial to all projects that seek growth and is particularly powerful in the context of the global South. [29]

Sampling, appropriating, and remixing

A strategy for responding to the postcolonial condition can be retrieving, reinscribing, and (to an extent) reimagining what precolonial narratives, value systems, and histories have persisted. While *ATH*¹ featured a modified version of an existing open source game, in *LBA*², our team of game designers designed a persistent game based on the folk mythology of *Maria Makiling*. *LBA*² was built near the base of Mount Makiling, a forest reserve. *Maria Makiling* is the deity believed to protect the mountain. [30] During the initial conceptualization stage of the computer game, the *LBA*² team decided to use *Maria Makiling*’s mythology as core inspiration specifically because its overtly ecological undertones. The entire team was invited to contribute concepts and narratives, both through on site discussions and through the mailing list.

It quickly became clear there were roughly two groups in the team: people that had little or no experience with computer games, and people that considered themselves literate in games with at least basic knowledge about game

mechanics and genres. The first group tended to focus on creating detailed narratives, more akin to scriptwriting in film. The second group was more concerned about creating a technically feasible gameplay that would emanate some of the mythology’s core ideas. One particular discussion stood out during game development: how much of the mythology could be reinvented and rehashed? When someone suggested mixing characters (in the form of different mountains from the Philippines), this caused a backlash with some of the team members. One of the core team members gave a compelling argument: “Putting [the mountain] Banahaw as a character [in a game about the story of Mount Makiling] would be like placing a Marvel character into a DC comic. If this were all a parody, why not? But it’s not.”

Our colleague’s concerns runs along a similar vein in the world of commercial video games where (up till recently at least) stories and perspectives of indigenous peoples around the world have been under- or misrepresented. [31] Here we find it relevant to highlight categories on the use of traditional themes that others – such as game company Upper One Games – have articulated. Upper One Games specializes in designing games on indigenous themes and narratives, and distinguishes between games that *appropriate, sample, depict,* and are *infused by* indigenous culture. [32] While our goal in *Biomodd* was to infuse, perhaps we ended up at best sampling. However, we strove to avoid unauthorized appropriation. We did not find any cultural proscriptions about how the narrative of Maria Makiling (or, for that matter, of Banahaw) could be shared – unlike, for example, a case that Irani et al have described concerning an Australian Aboriginal people and one of their sacred narratives whose telling was strictly regulated. [12] Still, the issue raised many questions around the extent to which we were at liberty to remix ideas, symbols, and mythologies.

In the end, we decided that the Maria Makiling mythology would be the overarching theme of the entire *LBA²* project, including the game. Two players on one keyboard can play the resulting multiplayer game. The game world is a single screen in which the character of Maria Makiling takes centre stage. The goal of the game is to help protect her forest ecosystem and assist with reforestation. Destruc-



Figure 4. The *Biomodd* [*LBA²*] game. Video of a gameplay sample is available on <http://youtu.be/7TtKs4gq4Q>.

tive projectiles from outside are attacking the forest. Players can either choose to be a protector, or a grower. Protectors can set up temporary barriers while growers can plant trees. In order for the forest to fully develop, players have to collaborate. When the game is left alone, the forest will disappear. The character of Maria Makiling also tweeted about the state of her forest and thanked players for helping out. In this way the *Biomodd* also continued beyond the walls of the spaces where it was exhibited. Figure 4 shows a screenshot from the game.

The rhizome and the tree

One of *ATH¹*’s main features is the metal frame that encases the electronics and the living ecosystems that have been brought into close contact with each other. It is a singular structure, erect and imposing. In subsequent versions of *Biomodd*, this central structure has grown increasingly monumental. In addition to commenting on the potentially phallogocentric imagery that this evokes, there was discussion in the team about reimagining the structure instead as a redistributed system of smaller structures. It was suggested by at least one member of the Philippine team that this perhaps might be a more ‘truthful’ or ‘progressive’ vernacular aesthetic that resonates in the Philippine context because of many reasons, including the archipelagic geography of the country; the importance and pervasiveness of many small-scale economic structures (such as the pervasive *sari-sari* stores and countless sidewalk vendors); and the continued failure of large-scale governance. [33] There was even a material and practical basis for such a distributed structure: one of the workshops we had undertaken involved creating tiny *Biomodd* structures using inexpensive shower racks as scaffolding. It would not have been too much of a stretch to build on these tiny structures and link them together to form a dense network of small *Biomodd* structures.

We believe that this debate within was in fact rooted in the team’s (perhaps implicit) understanding of two basic structures that Deleuze and Guattari have described: the tree and the rhizome. [34] The rhizome “resists structures of domination” and “ceaselessly establishes connections between semiotic chains, organizations of power, and circumstances relative to the arts, sciences, and social struggles”. [34, p. 7], [35] Deleuze and Guattari contrast the rhizome against the tree, which is linear, and has “dominated Western reality and all of Western thought, from botany to biology and anatomy, but also gnosiology, theology, ontology, all of philosophy”. [34, p. 18] Thus, the rhizome could be seen as a possible structure of postcolonial grassroots movements: decentralized, distributed, and resilient to rupture.

But the monolith prevailed, for reasons related to why *LBA²* as a whole emerged as a functional, rather than a conceptual, translation of *ATH¹*, as already mentioned. Perhaps the single, monumental case persisted also because of what Deleuze and Guattari have called the “arborescent schema” that pervades contemporary imperialized, post-colonial cultures. [34, p. 328] The debate, however, was

not forgotten. A later *Biomodd* workshop in St-Niklaas, Belgium, expanded on the shower rack prototyping exercise. Using found objects of all sorts, participants produced a diverse array of ‘miniature’ *Biomodd* systems whose sensibilities ranged from the grotesque to the delightful, recalling the heterotopia of the rhizome. All were networked and displayed in a horizontal layout. A recent *Biomodd* workshop in Santiago, Chile generated similar small systems distributed throughout the trees and scrubs of an art gallery garden.

Towards a heterotopia of design fictions

We deliberately concluded the previous discussion on postcolonial themes in *LBA*² with the theme of the rhizome, as well as with a mention of subsequent *Biomodd* versions. Since *LBA*², we have facilitated other *Biomodd* projects in other countries. But several other versions of *Biomodd* were also built independently by other groups in the Philippines in response to *LBA*². [17] To what extent can the independent *Biomodd* projects be called *Biomodd* versions? Perhaps the most appropriate answer is a question: does it matter what the answer is? The heterotopia of the rhizome rests on the belief that diversity matters, that diversity is good. It is one we subscribe to, at least for now.

We had mentioned that one of the contingencies that the *LBA*² team were forced to reckon with was temporality. Reflecting on our experiences in *LBA*², we wonder what would have happened if we had more time than the eight months that we had to work on the project. Would it have looked very different? Probably. Perhaps we could have better taken to heart Irani et al’s abstracted framework for a postcolonial computing design collaboration, involving *engagement*, *articulation*, and *translation*. [12] This abstraction, it seems, allows people room to breathe, and think, and act, and then breathe again. We have found that creating ground-up movements of art-science collaboration in the Philippines requires time. An open call for scientists and artists to collaborate with us on *LBA*² went unheeded for months. It was only after we had spent several months building networks, holding social events and fundraisers, did we finally manage to attract the kind of expertise that significantly contributed to the growth of the project.

Nevertheless, we take the fact that independent groups in the Philippines initiated their own *Biomodd* initiatives as a sign that there is indeed a space for projects that straddle

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the boundaries of art and science. We submit that like Irani et al’s notion of postcolonial computing, *Biomodd* is a sensibility, not a methodology. It is an approach that seeks to nurture that awareness of critical connectedness, and affiliates itself with the countless of other projects around the world that hopes to do the same thing (or, rather, something similar enough). For instance, we also see *Biomodd* as an example of design fiction or speculative design. [36] *Biomodd* does not meet directly solve an immediate problem, but it does aim to suggest to the viewer a parallel reality that in which alternative ecological relations exist.

Conclusion

In this paper, we used a postcolonial lens to re-examine our experience of working on *Biomodd* [*LBA*²], a large-scale, collaborative, art-science project in the Philippines that was based off a prior project completed in the USA. We used a comparative discussion of the components of the physical installations that were built in both contexts to examine how the different social, political, and economic contexts influenced the final outcomes. We revisited the appropriateness of the metaphor of heat recycling in the tropics; unpacked issues regarding authenticity, hybridity and colonization in the poetic use of multiple varieties of *Chlorella* algae; examined how conflicting definitions of obsolescence in e-waste led to the conversion of different forms of capital; reflected on whether our use of folk narratives constituted sampling, remixing, and appropriating; and elaborated on the rhizome and the tree as metaphors for collaboration and social organization. We hope to report in future publications on the outcomes of other *Biomodd* projects that have been initiated since *LBA*², and on our continuing effort to build alliances with individuals, organizations, and initiatives that seek to articulate the sensibilities that the *Biomodd* platform embodies.

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