



Decolonial and Postcolonial Computing Research: A Scientometric Exploration

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ABSTRACT

Decolonial and postcolonial computing scholars focus on the relationship between coloniality and technology. While many recent empirical and design studies have adopted these theoretical lenses, these conversations are often disconnected. Through a systematic literature review, we seek to understand patterns within and between decolonial computing and postcolonial computing. As an early step toward that objective, this poster presents results from our preliminary scientometric exploration of 115 papers' metadata and discusses research trends and popular publication venues in these areas. Using citation network analysis, we found smaller communities in decolonial and postcolonial computing scholarship based on their use of theoretical frameworks, objectives, types of papers, authors' collaboration and affiliations, and research sites and populations. We conclude by discussing future research directions to bring these communities into conversations with each other.

CCS CONCEPTS

• **Human-centered computing** → **Empirical studies in collaborative and social computing**; **Collaborative and social computing theory, concepts and paradigms**; **HCI theory, concepts and models**.

KEYWORDS

decolonial computing, postcolonial computing, scientometric analysis, systematic literature review

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1 INTRODUCTION

In recent years, HCI and social computing scholars have shown increasing interest in studying the relationship between technology and colonialism—the policies and practices by which foreign forces

migrate to other regions, marginalize and alter cultures, sociopolitical and economic structures of the local and indigenous peoples [59]. Two discourse groups emerged exploring the relationship between societies and coloniality—postcolonial and decolonial [14] which are often viewed as competing traditions. Drawing on prior literature [14, 26], we argue that decolonial and postcolonial perspectives are complementary.

Studies by postcolonial computing scholars are fundamental for understanding the colonial impulses of technology, power hierarchy in design, cultural differences in technological practices, etc. [31, 45]. As a response to these understanding and lessons, research from the point of view of decolonial computing can help us shape critical technical practices, seek reverse tutelage and reverse pedagogies and center the voices from the margins [5, 67].

A systematic literature review (SLR) of the published works in decolonial and postcolonial computing can help us put scholars of these domains into conversations for a holistic understanding of how technologies perpetuate colonial hierarchies and prejudices and ways to resist those influences. Though qualitative SLRs are more common in social computing [51, 73, 80], quantitative or scientometric SLRs which are particularly useful to unpack the evolutionary nuances of a specific field while shedding light on the emerging areas within that field [28], have also previously appeared in the broader HCI community [1, 11]. This poster presents preliminary scientometric analysis using data visualization and citation network analysis.

The following section briefly overviews postcolonialism, decolonialism, postcolonial computing, and decolonial computing. Then, we describe our methods for data collection and analysis. The following section presents findings based on our collected corpus. Two main contributions of this poster are (a) the creation and characterization of a literature corpus on decolonial and postcolonial computing and (b) the identification of communities within these domains based on how these papers cite and draw on each other. Finally, we discuss future research directions for connecting decolonial and postcolonial discourse within the HCI communities.

2 LITERATURE REVIEW

Postcolonialism, as an ideological discipline, emerged from and developed through the works of Edward Said [81], Gayatri Spivak [86], Homi Bhabha [13], Dipesh Chakrabarty [20]—diasporic scholars from the Middle East and South Asia. They, for the most part, refer back to those locations and their imperial interlocutors. Postcolonial scholars study the impacts of colonialism, especially in the cultural realm, and refer to mainly the nineteenth and twentieth

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centuries [14]. On the contrary, decolonial perspective has historically grown out of the works by African and Latin American diasporic scholars [70] such as Aimé Césaire [19], Frantz Fanon [33, 34], Walter Dignolo [63, 64], Sylvia Wynter [95], Anibal Quijano [78]. Decolonial scholars explore colonialism from the fifteenth century onward, articulating a rejection of racial supremacy of the West over its colonial subjects [14, 70].

In the discipline of computing, the phrase “postcolonial computing” was coined in 2010 by Irani and colleagues [45]. They highlighted how technology is designed in the West and with Western values, and when it migrates elsewhere and encounters different cultures, it can perpetuate coloniality. Building on their argument, Dourish and Mainwaring described the colonial impulses of ubiquitous computing [31]. In 2014, Ali introduced the phrase “decolonial computing” [4]. His later article [5] re-introduced the phrase in 2016, which seems to have gained more traction to date. Whereas postcolonial computing researchers have studied how unique local practices emerge around technologies [2, 26, 44] and how technologies work as a medium of imposition of Western standards on the Global South [66, 79], decolonial computing scholars have studied the innovation practices in the Global South that reflect local needs, imagination, and values [15, 23, 74, 93]. Scholars have argued that gaps exist in how these theoretical frameworks are used in social computing [26]. This poster investigates whether and how scholarship in these domains is separated.

3 METHODS

3.1 Search Strategy and Dataset Preparation

We bound the scope of this poster within the published works in the Association for Computing Machinery (ACM) Digital Library¹ (ACM DL). We identified an initial set of candidate papers using a keyword search within this database. In our query, we were careful of the spelling variations, such as different hyphenating styles (e.g., postcolonial and post-colonial) and North American and British English (e.g., colonization and colonisation). Our list of keywords included the following terms: Colony, Colonization/ Colonisation, Colonize/ Colonise, Colonial, Colonialism, Coloniality, Postcolonial/ Post-colonial, Postcolonialism/ Post-colonialism, Postcoloniality/ Post-coloniality, Decolonial, Decolonization/ Decolonisation, Decolonize/ Decolonise, Decolonialism, Decoloniality, and Decolonizing/ Decolonising.

Because of the contemporary and emergent nature of the discussion around decolonial and postcolonial computing in our field, we have included not only full papers but also short papers, workshop papers, and posters. We also did not put any limits on the publishing date of the papers. Many of these articles use postcolonial or decolonial computing as a tangential idea and not as the paper’s primary focus (e.g., mentioning the term(s) nominally in the discussion section). As a scoping strategy, we argue that any term related to decolonization or postcolonialism appearing in the abstract indicates the paper centering itself around those concepts of interest. Therefore, we searched so that it retrieves only those papers which mention any of our search terms in their abstracts. Our query for the papers with any of these keywords in the abstracts retrieved 757 results on May 25, 2022. We collected these

¹<https://dl.acm.org/>

papers’ metadata: type (i.e., journal article, proceeding article, or book chapter), title, authors’ information, DOI, URL, year, abstract, author-defined keywords, venue (i.e., journal, book title, conference name), and location (for conferences), from ACM DL².

A few terms in our keywords list can be confounding because of their use in many other contexts. For example, the term “colony” can appear in the contexts of mushroom colony, pathogen colonization, and ant colony in bio-informatics or evolutionary computing papers. Hence, using those keywords retrieves a large number of papers that are not related to decolonial and postcolonial computing. Therefore, we excluded the papers that mention terms/phrases like ant/bee/swarm colony, genetic, evolutionary, etc., in their titles or abstracts to scope the dataset. Again, the papers published in venues traditionally focused on bio-informatics or evolutionary computing venues (e.g., GECCO³, AAMAS⁴) or networking and computer systems-focused venues (e.g., Middleware⁵, LANC⁶), were labeled as non-relevant. For papers published in conferences or journals that seemed more generalized or interdisciplinary, we read through the titles and abstracts to label them relevant or non-relevant. For example, a speculative article [55] published in Communications of the ACM used the term “colonize” in the context of colonization of galaxies. Thus, we determined that the relationship of this paper to decolonial and postcolonial literature was distant; hence, we labeled it as non-relevant. The first author labeled the relevance of the data. In case of confusion, he consulted with the second author to reach a “negotiated agreement” [38] about the relevance of a particular paper. After filtering, our final dataset contained 115 papers. We also collected citation data from OpenCitations⁷ for each paper in our corpus.

3.2 Data Analysis

In this study, we used a scientometric approach—looking at the quantitative features and characteristics of scientific research. After doing basic data wrangling using Python, we used data visualization to understand the evolution of the number of papers on decolonial and postcolonial computing over the years and identify popular publication venues for such studies. Based on the citation data, we constructed a citation network considering each paper as a node, identified with its DOI. A directed edge between two nodes represents their citation relation: from a cited paper (Source) to a paper citing the former (Target). Since in this poster, we are only interested in papers published in ACM DL, we did not include papers from other publishers while constructing the network. We used Gephi [12] and NetworkX [40] for network visualization and analysis.

3.3 Limitation

Prior studies have highlighted that researchers’ backgrounds can influence the decision-making about the relevance of data with the context of studies [25]. The authors’ academic training and research experience in human-computer interaction and social computing

²The dataset is publicly available here: shorturl.at/agHW7

³Genetic and Evolutionary Computation Conference

⁴International Conference on Autonomous Agents and Multiagent Systems

⁵ACM/IFIP International Middleware Conference

⁶Latin American Networking Conference

⁷<https://opencitations.net/>

have influenced the papers' data relevance labeling, thus forming the final dataset. Again, the decision of only considering the papers published in ACM DL might be disadvantaging for scholars from the margins, who do not publish at ACM conferences for financial reasons [54, 57]. Moreover, research in decolonial and postcolonial computing can be of interest across a wide range of conferences and journals. Therefore, future works should consider databases of other publishers like IEEE, Elsevier, and Springer. Even within the ACM conferences, papers published at local conferences compared to our celebrated venues (e.g., CHI, CSCW) often are subject to discriminatory citational politics—not being cited despite their relevance [32, 54]. Thus, citation network analysis might be unable to place such papers in the same communities as other relevant publications.

4 RESULTS

4.1 Characterizing the Corpus

Within our corpus, CHI was the venue where decolonial and postcolonial computing research papers were published most frequently, with 30 publications (see Figure 1(a)). Other venues with multiple publications were: PDC (9), PACM (8), ICTD (5), XRDS (5), CSCW (4), AfriCHI (4), SIGGRAPH (3), DIS (3), ICLS (3), AIES (3), ASIST (2), FAcT (2), Interactions (2), JCDL (2), SIGDOC (2), UbiComp (2), and iConference (2). Besides, at least one paper on postcolonial and decolonial computing appeared at venues such as TEI, UIST, and WWW. In Figure 1(b), the green dashed line shows the year when Irani and colleagues [45] introduced the term postcolonial computing, and the purple dashed line shows the year when Ali [4] coined the phrase decolonial computing. We can see a significant uptick in the number of papers after 2014, suggesting that decolonial and postcolonial computing are emerging fields of study in HCI.

Our dataset included the author defined keywords, when those were available. We tried to visualize those as word cloud in Figure 2(a). Dominance of the terms like decolonization and design shows the focus of decolonial and postcolonial computing literature. Again, keywords like ICTD and HCI4D being highlighted shows us the communities within HCI and social computing from where most of the papers in our corpus are coming. We are also interested to see what words appear frequently in the abstracts of the papers in our corpus. As a preprocessing step, we removed the common English stopwords (e.g., prepositions, articles) and field-specific stopwords (e.g., research, paper) from the abstracts. Figure 2(b) shows the resulting word cloud based on all abstracts in our corpus. Here, the enlarged words such as design, practice, experience, and development show that postcolonial and decolonial computing theoretical framing to be particularly helpful for studying the practice and experience of different communities and impactful in design and development research.

4.2 Identifying Communities in Corpus

While doing citation network analysis, we hypothesize that the papers using postcolonialism as their theoretical thrust mention terms like *postcolonial*, *postcolonialism*, *postcoloniality* in the abstracts. The corresponding nodes are colored green. The nodes representing decolonial computing papers, i.e., whose abstracts mention *decolonial*, *decolonize*, *decoloniality*, are colored in purple.

Blue nodes represent the papers that mention words from both groups in abstracts. Corresponding nodes for the papers with abstracts not mentioning words related to either of the two theoretical domains are orange in color. These nodes might have been included in the network because they contain other keywords from our list (e.g., *colonial*, *colonization*) in their abstracts or have cited postcolonial or decolonial computing papers. Figure 3 presents the network using Fruchterman-Reingold layout [37], where the sizes of nodes represent the out-degrees, i.e., the citation counts of the papers within our corpus. There are 62 components in this disconnected network.

Top three papers with the highest degree centrality [71] are: "Postcolonial computing: a lens on design and development" [45], "UbiComp's colonial impulse" [31], and "A brief introduction to decolonial computing" [5]. The network's modularity=0.45 (using Louvain algorithm [17]) indicates a community structure [35]. We identified 66 communities within the network. Among those, 61 have only one item each. Rest five communities comprising multiple papers are intriguing for understanding how different communities have emerged within the decolonial and postcolonial computing research field. These five multi-paper communities are (A) [2, 3, 10, 21, 44, 45, 47, 48, 58, 65, 66, 68, 85, 87, 88], (B) [7, 9, 16, 31, 41–43, 46, 50, 61, 69, 77, 93, 94], (C) [23, 27, 49, 62, 76, 90], (D) [6, 8, 18, 22, 36, 60, 72, 84, 91, 92], and (E) [5, 24, 29, 30, 39, 52, 56, 83, 89]. For easier comprehension, we list the titles of the papers within communities in Table 1 in the appendix.

Looking at the papers under each community, we can identify patterns in their titles, abstracts, research sites, theoretical frameworks, objectives, author' affiliations and collaborations, and publication venues. For example, the papers under community-C focus on design which is evidenced through the dominance of terms like "participatory" [23, 49, 62], "design" [23, 27, 62], "probing" [90] in their titles and abstracts and their appearances at design oriented conferences like PDC [23, 62, 90], DIS [49], and SIGDOC [76]. community-D comprises mostly theoretical papers (e.g., on pluriversity [18, 84]) strongly associated with decolonial computing and decoloniality at large. These papers have articulated decolonial intentions, motives, or views in various spaces such as focusing on HCI education [92], research [6, 8, 36], learning spaces [91], etc. In contrast, most papers in community-E present empirical studies in various contexts and topics such as online platform moderation [24, 29], education [39, 56], and health care [89]. As these studies mostly adopted the decolonial computing perspective, the same community also included Ali's well-cited article on decolonial computing [5]. We also found that studies conducted in similar research populations got placed under the same communities during our network analysis. For example, out of 14 papers under community-B, six studies were conducted in African countries (e.g., Kenya [93, 94], Zambia [94], Rwanda [43], South Africa [77]), and nine out of 15 papers under community-A chose South Asian countries (e.g., Bangladesh [2, 44], India [21, 47]) as their research sites. The foundational work by Irani and colleagues [45] exists in community-A in which the empirical studies [2, 44, 66, 87] heavily drew on this theoretical framework. Similar to South Asian scholars' instrumental roles in developing postcolonialism, it is interesting to see that most of these studies in the South Asian context used postcolonial computing as their theoretical lens. We also observed high

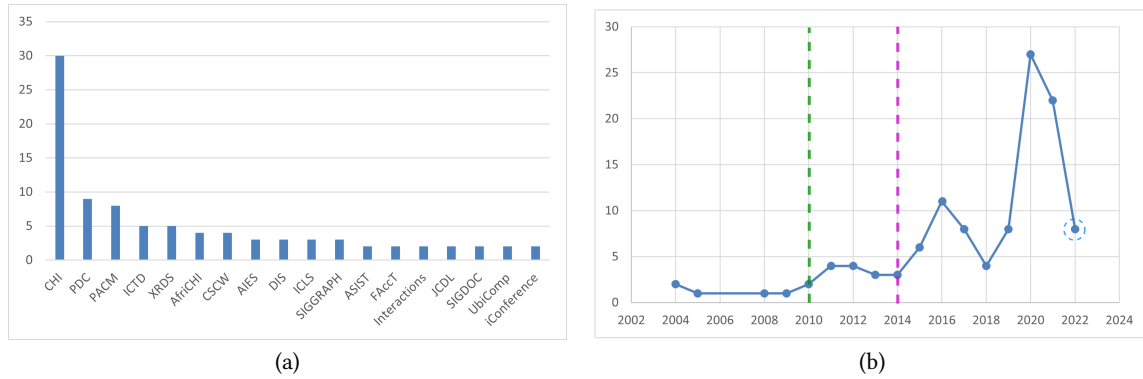


Figure 1: Number of papers in our corpus (a) at different venues (b) by year (number of papers in 2022, circled with blue dashed line, shows the count until the date of data collection).

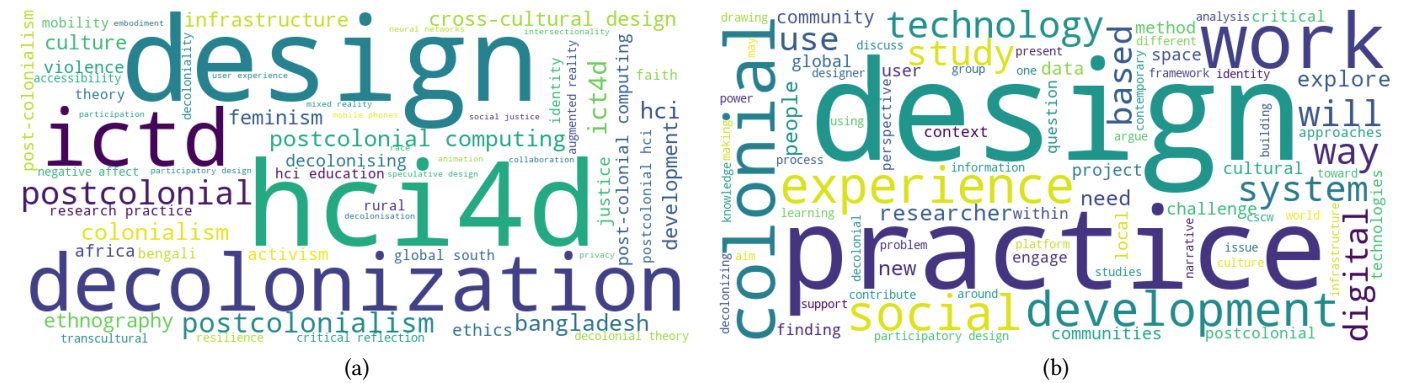


Figure 2: Word clouds based the papers’ (a) keywords (b) abstracts.

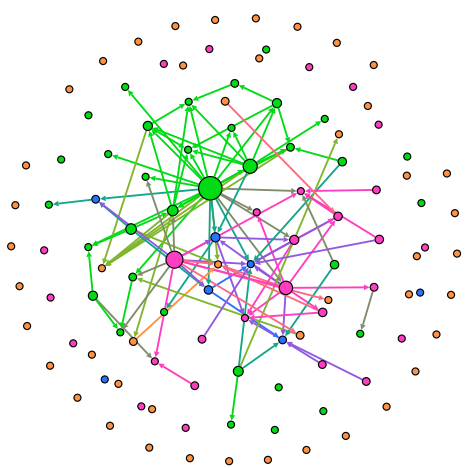


Figure 3: Citation network of papers in our corpus.

intra-community similarity and inter-community dissimilarity, for example, particular authors and affiliations appearing dominantly in one particular community and being less visible in others (e.g.,

a large number of papers from the same affiliation [2, 21, 48] in community-A).

5 DISCUSSION

While adopting decolonial and postcolonial computing perspectives to study different contexts, scholars’ questions revolve around power, authority, participation, and intelligibility of technology. Despite being closely related, our scientometric analysis shows that the scholarship in these areas is disconnected and divided into communities based on their adoption of theoretical frameworks (e.g., decolonial and postcolonial), contribution (e.g., empirical, design, theoretical), and authors’ affiliation and collaboration. While postcolonial computing simultaneously explains the colonality of technology [31, 45] and the agency of users [53, 82], decolonial computing aims to imagine and create technology reflecting indigenous perspectives [5, 75]. In our future work, we will develop a framework to connect decolonial and postcolonial discourses in HCI and social computing through a qualitative SLR.

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APPENDIX

Table 1: Multi-paper communities and the titles of the papers within those communities.

Multi-paper community	Titles of the papers within community
A	<p>Postcolonial computing: a lens on design and development [45], Chasing Luck: Data-driven Prediction, Faith, Hunch, and Cultural Norms in Rural Betting Practices [88], Witchcraft and HCI: Morality, modernity, and postcolonial computing in rural Bangladesh [87], Parsing the 'Me'in# MeToo: Sexual Harassment, Social Media, and Justice Infrastructures [68], Gospels of Modernity: Digital Cattle Markets, Urban Religiosity, and Secular Computing in the Global South [65], Residual mobilities: infrastructural displacement and post-colonial computing in Bangladesh [2], Others' Images: Online Social Media, Architectural Improvisations, and Spatial Marginalization in Bangladesh [66], Privacy vulnerabilities in public digital service centers in Dhaka, Bangladesh [44], Market practices and the bazaar: Technology consumption in ICT markets in the global south [21], Engaging solidarity in data collection practices for community health [47], Cross-cultural dialogical probes [85], Logistics as care and control: An investigation into the UNICEF supply division [48], Disability design and innovation in low resource settings: addressing inequality through HCI [10], Speculative design and heterogeneity in indigenous nation building [3], Activated: Decentering activism in and with academia [58]</p>
B	<p>Ubicomp's colonial impulse [31], Postcolonial interculturality [46], Postcolonial language and culture theory for HCI4D [61], Decolonising Technology Design [16], Decolonising technology design [9], "If god gives me the chance i will design my own phone" exploring mobile phone repair and postcolonial approaches to design in rural Kenya [93], Real mobiles: Kenyan and Zambian smallholder farmers' current attitudes towards mobile phones [94], Agency and Extraction in Emerging Industrial Drone Applications: Imaginaries of Rwandan Farm Workers and Community Members [43], Digital apartheid: an ethnographic account of racialised HCI in Cape Town hip-hop [77], Designing for negative affect and critical reflection [41], Designing for discomfort: Supporting critical reflection through interactive tools [42], Good for whom? Unsettling research practice [69], Challenges in supporting the emergent user [50], An Oldy's Lament: Poem of Resistance and Resilience of the 'Othered' in Technology Colonisation [7]</p>
C	<p>Participatory Memory Making: Creating Postcolonial Dialogic Engagements with Namibian Youth [49], Decolonizing participatory design: Memory making in Namibia [23], Cultural hybridity in participatory design [62], Breaking the cycle of Macondo: design and decolonial futures [27], Towards togetherness: probing as a decolonizing approach [90], Building Digital Archive through Collaborative UX Research: Relationship-Building with the Community or Knowledge-Building about the Community? [76]</p>
D	<p>Decolonial Pathways: Our Manifesto for a Decolonizing Agenda in HCI Research and Design [6], Decolonizing Design Practices: Towards Pluriversality [84], Decolonizing design through the perspectives of cosmological others: Arguing for an ontological turn in design research and practice [8], Decolonizing learning spaces for sociotechnical research and design [91], Reflections from the classroom and beyond: Imagining a decolonized HCI education [92], Imagining intersectional futures: Feminist approaches in CSCW [36], PD otherwise will be pluriversal (or it won't be) [18], Decolonising participatory design practices: Towards participations otherwise [22], Participatory design through a cultural lens: insights from postcolonial theory [60], Africa's social contract with AI [72]</p>
E	<p>A brief introduction to decolonial computing [5], "Jol" or "Pani"?: How Does Governance Shape a Platform's Identity? [24], Decolonizing tactics as collective resilience: Identity work of AAPI communities on Reddit [29], In the eye of the student: An intangible cultural heritage experience, with a human-computer interaction twist [39], HCI education of choice: on becoming critical and growing inclusivity [56], We Need More Power to Stand Up: Designing to Combat Stigmatization of the Caregivers of Children with Autism in Urban Bangladesh [89], On being iterated: The affective demands of design participation [30], Clash of times: Respectful technology space for integrating community stories in intangible exhibits [52], Speculation and the Design of Development [83]</p>