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Decolonizing Learning Spaces for Sociotechnical Research and Design

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ABSTRACT

As spaces for learning about Computer-Supported Collaborative Work (CSCW) research and practice (e.g., university classes, academic and industry labs, conferences) become more diverse, there is a pressing need to revise the universal collaborative and pedagogical structures supporting them.

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Table 1: Workshop Organizers



Adriana Alvarado Garcia is a Ph.D. student at the Georgia Institute of Technology. Using a mix-methods approach, she designs contextualized technologies that support social media data migration from online to offline context to advocate for human rights in the context of Latin America.



Heloisa Candello is a Research Scientist at IBM Research in Brazil and at the ACM SIGCHI Volunteer Development Committee. She has expertise in leading and conducting mixed-methods research activities to understand people's practices, and motivations to use AI technologies. Her research has been published in leading conferences in the HCI and Design fields.



Carl DiSalvo is a designer, writer, researcher, and educator. He is currently an Associate Professor at the Georgia Institute of Technology, with appointments in the School of Interactive Computing and the School of Literature, Media, and Communication, and directs the Experimental Civics Studio.



Marilyn Iriarte is a Ph.D. student at the University of Maryland. She focuses in human-computer interaction, user experience designs, and sociotechnical information challenges faced by the Latino community. Specifically, it has become urgent to explore how to 'de-center' dominant assumptions about who learns in these environments. The goal of this workshop is to explore collectively how to craft learning spaces that resist universality by recognizing and valuing other perspectives and realities. We build on the scholarship of decolonial thinkers, which provides useful theoretical scaffolding on how to start working towards inclusivity and 'pluriversality'. That is, learning spaces where all views can co-exist as equally valid, albeit contradicting. Our workshop will be led by researchers and designers who have both guided and participated in academic and industry-based CSCW learning spaces across domains like Social Computing, Human-Computer Interaction (HCI), Information and Communication Technologies for Development (ICTD), Critical Data Studies, and Participatory Design (PD). We invite a broad range of participants from research and practice interested in learning about or deepening their understanding of how to make of CSCW a more 'pluriversal' site for learning and practicing.

CCS CONCEPTS

• Human-centered computing → HCI theory, concepts and models; Computer supported cooperative work; Collaborative content creation.

KEYWORDS

Decolonization, decolonizing methodologies, CSCW education, CSCW research, mentorship, LATAM

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INTRODUCTION

The adequate establishment and support of learning spaces for training researchers and practitioners in sociotechnical research and design are critical for fostering a thriving CSCW scholarship [7, 17, 25, 26]. Such spaces can be varied, ranging from university classes and labs, workshops at a tech company, to virtual gatherings via videoconference. Academia and industry both traditionally structure these spaces to promote concepts, practices, and applications—e.g., research and design methods, collaboration frameworks and dynamics, and research themes and agendas—historically defined by ontological and epistemological Western paradigms, primarily from the Global North [27, 28]. These dominant views tend, then, to impose ways of engaging in academic projects and publishing across the world, albeit being inadequate for particular contexts. For example, technology design has imposed an idea of privacy in African villages that does not match the cultural practices of those communities [22].

Table 2: Workshop Organizers (cont.)



Juan Fernando Maestre is a Ph.D. candidate in Informatics at Indiana University. His research is at the intersection of HCI research methods, technology, and stigma. He applies novel methods to recruit and conduct research remotely with marginalized and vulnerable populations.



Pedro Reynolds-Cuéllar is a Ph.D. student in the Center for Civic Media Group at the MIT Media Lab. His research focuses on studying and proposing participatory frameworks and methods to conduct community-based, low-cost, appropriate technology design in collaboration with rural, historically marginalized communities in Latin America.



Marisol Wong-Villacres is a Ph.D. candidate in Human-Centered Computing at Georgia Tech and also faculty at the Computer Science program of the Escuela Superior Politecnica del Litoral in Ecuador. Her research interests lie at the intersection of culture, learning sciences, and information access, with a specific focus on pursuing an assets-based design of technologies for vulnerable communities.

Likewise, to make their work visible, African researchers must explain their findings using HCI dominant discourse [6]. As CSCW spaces of learning and practice are arguably becoming more diverse [29], such universalistic views of learning, socio-technical research and design, become even more problematic. Recognizing the need for transformation, the CSCW and HCI communities have promoted research, panels, and workshops that cater to CSCW knowledge production outside of mainstream contexts (e.g., with groups historically marginalized, and across areas of the Global South like Latin America and Africa) [6, 10–12, 17, 18, 27].

Many of these efforts, however, explore how to adapt universalizing concepts and develop particular methods for learning audiences at the periphery of an assumed norm. In doing so, they unintentionally reinforce an us-vs-them divide, preventing CSCW from becoming a discipline that grows from the relationality of diverse philosophies, experiences, knowledges, and goals. We contend that a turn to decolonizing theories and practices can help CSCW to resist such disconnection.

The decolonizing scholarship promotes an uncoupling from ideas surrounding modernity—which continually strives to impose a 'right' way to move forward (e.g., optimizing for growth, defining outcomes in terms of profit, centering the human)-and instead proposes to build spaces where interconnections are increasingly visible and practicable [14, 19, 20]. Similar to postcolonial theories, the decolonial scholarship critiques Eurocentric attempts to impose universal forms of knowledge that promote the subordination of the periphery [3, 16]. Both approaches strive to highlight how this universalistic view of knowledge operates by cannibalizing elements of local knowledge it finds useful and delegitimizing the rest as 'just' culture, tradition, or belief. However, postcolonialism's view of colonization as something from the past limits its ability to illuminate paths for moving away from Eurocentrism [2, 14, 16, 24]. In contrast, by stressing that colonialism is the inevitable, darker side of our efforts to maintain and develop modernity [13, 23], decolonial thinking fosters the opportunity to imagine changes that detach us from a universal structure of knowledge altogether [20]. Inspired by popular struggles and communities' resistance around the world, the decolonial goal is to foster 'a world of many worlds,' or 'pluriverse', where contradicting ontologies and epistemologies can co-exist without needing to align with each other or claiming more validity over others [15, 19]. In this pluriverse, each different world is valid and thrives from recognizing its partial connections with the rest, without striving for sameness [8, 9, 21].

Drawing from a decolonizing perspective to rethink learning spaces in CSCW, thus, can shed light on novel pathways for understanding and learning from multiple ways of collaborating, designing technology, and interacting with each other within the CSCW practice. We argue that such a view can provide a language to articulate the experiences of those working to make diversity thrive in a learning environment and a lens to envision how to support them. A handful of work in HCI has already started to explore how a decolonizing perspective can construct pluralistic design practices

Table 3: Workshop Goals

Drawing from decolonial scholars [21], we recognize that attempting to provide global answers on practicing decoloniality within the CSCW community would hinder the feasibility of pluriverses. Our workshop's goal is to foster the practice of engaging in relationality. Thus, instead of merely deriving guidelines from participant's ideas and practices, we will promote the discovery of connections and correlations. Our activities will facilitate conversations amongst participants to foster a mutual understandings as well as to contest typically assumed academic thought. Broadly, the goals of our workshop are:

- Understanding Decoloniality. Decoloniality as described by [21, 23], seeks to make visible and advance diverse perspectives and positionalities, displacing Western rationality as the only framework of analysis and thought. At the same time, decoloniality is, by all means, contextual [14, 21]. To start working towards a pluralistic future for CSCW, we will first engage in reflections on what coloniality and decoloniality has meant to us personally and then, collectively; within and beyond the academic setting.
- Thinking About Decoloniality in CSCW. After reaching a collective understanding of what decoloniality means, we will then transition into exploring questions such as How has the CSCW community and its learning spaces been impacted by coloniality? and What would it mean for CSCW to deconstruct disconnections within its learning spaces and beyond?
- Making Decolonial Paths for CSCW. Lastly, we
 will collectively discuss how to bring decoloniality
 into our praxis; that is, imagining possible decolonial paths that promote relational ways of seeing
 and doing in CSCW. Inspired by [21] we will focus
 on answering the questions of the for, the how, and
 the with whom, and what for decoloniality within
 CSCW learning and practice.

and classrooms [1, 2, 4–6, 28]. Our workshop proposes to expand these views for changing how training takes place in CSCW, relying on them as analytical tools guiding us along the way.

Driven by decolonial thinking, we seek to move the discussion on diversity in CSCW away from unproductive anti-Western critiques that perpetuate the separation of different worlds. To that end, we will motivate three critical reflections for crafting CSCW learning spaces where different ontologies and epistemologies can co-exist. Striving for relationally, we will work with participants in leveraging their experiences to build connections across visions of what colonial and decolonized spaces can entail and produce. Second, we will bring those reflections to spaces for learning about CSCW, discussing how they are impacted by universal ways of thinking and what a decolonizing perspective can change to that regard. Finally, inspired by [21] we will work on imagining decolonial paths, particularly stressing on the human and non-human resources needed to operationalize them. As we facilitate participants' work across these three reflections, we aim at informing radical pathways—including actions and resources—for academia and industry to support CSCW in becoming a 'world of many worlds.'

RECRUITING PARTICIPANTS

The organizers (Table 1 and 2) will disseminate a Call for Participation in relevant email lists, social media as well as via their professional networks. The call will include a link to the workshop website where participants will be able to read more details about the workshop, its format, schedule, and submission requirements. We will invite a broad range of participants from researchers, practitioners, educators, and mentors from both academia and industry interested in discussing and take actions to make CSCW a more 'pluriversal' site for learning and practicing. We are planning on accepting and inviting 20 participants.

Interested participants will be asked to submit a 3 to 6 pages position paper that describes their experiences in spaces for learning CSCW research and design practices, including their efforts to have their voices heard, or promoting conversations and connections to build mutual understanding. Submissions should also include a discussion on authors' views for making CSCW learning spaces more welcoming to diverse forms of knowledge and doing. We also want to include participants who have not yet heard of or thought of decolonizing practices, and welcome their position papers to include a reflection on the potential and/or limitations of this approach for CSCW.

Position papers will be peer-reviewed and final decisions will be made by the workshop organizers taking into account their relevance to the workshop's goals. After reviewing the submitted position papers, we will make these available in the workshop website. Workshop participants will be expected to read through the accepted papers as well as a list of recommended readings on decolonizing theory and praxis to consider prior to attending the workshop. This will be vital for engaging in our workshop activities.

Table 4: Workshop Outcomes

- Reflections. A contribution of the workshop would be the creation of online artifacts (e.g., Miro boards) conveying participants' reflections on what could help researchers and practitioners in the HCI and CSCW fields advance distinct perspectives and positionalities. After the workshop concludes, we will collaborate with participants in transferring these reflections into blog posts that we will publish on the workshop website as well as in a Medium article.
- Resources. We envision compiling a list of prior research and other material (e.g., websites, repositories of articles, etc.) that encourage people in academia and industry to engage with decolonizing practices when crafting their educational and learning materials. Moreover, resources will be organized per region and cultural contexts so that researchers can get access to resources that have been created or used in particular contexts.
- Publication of Position Papers. The positions papers that summarize the participants' experiences will be published on the workshop website.
 The papers will be organized according to context, learning area, type of population, etc.

WORKSHOP OUTLINE

The goals and outcomes of the workshop are explained in more detail in tables 3 and 4, respectively. In order to avoid long remote sessions and to accommodate participants joining from different time zones, the workshop will take place in two stages. The *first* will be a pre-workshop, entirely asynchronous stage supported by Discord as a communication platform and a Miro board to facilitate participants in getting to know each other and sharing their thoughts on *(de)coloniality* (coloniality and decolonization). The *second* stage will consist of two 4-hour video conference sessions. During this stage, we will encourage participants to also use asynchronous spaces of interaction for continuing discussions around workshop topics.

Pre-workshop Activities

- **Introductions.** Over Discord, we will invite participants to introduce themselves and share their experiences with (de)coloniality as well as their expectations for the workshop.
- Position Paper Videos. We will encourage participants to record 3 to 5 minute video capturing the main ideas of their position papers. The purpose of these videos will be having additional resources so participants will be able to get familiar with each other's ideas before the workshop. We will distribute the videos on our website and a Miro board and hopefully will spark conversations and encourage connections.
- Reflections/Questions on (De)coloniality. We will share participants' position papers and videos on a virtual Miro whiteboard and encourage them to add post-it notes capturing thoughts on coloniality in CSCW and on decolonizing it. This can include reflections on barriers, opportunities, lessons learned, tools, and ethical considerations.

Workshop Sessions

In the following list, we give an overview of the activities we plan to conduct during the two 4-hour workshop sessions. We also provide a detailed description of the sessions' schedule in Table 5.

- **Lightning Talks.** After introducing the workshop, we will ask participants to give a very short presentation about themselves, their position papers, and their expectations for the workshop, using the pre-workshop Miro board as a point of reference.
- Panel. Senior members of both academia and industry will be invited to talk on a panel to share their perspectives and experiences on how to apply the concept of decolonization to CSCW learning spaces, their research agenda, and jobs. Participants will have the opportunity to ask questions and engage in discussion with panelists. We expect to recruit at least four senior members with diverse geopolitical and intellectual backgrounds. If panelists agree, we

Table 5: Workshop Sessions - Schedule

Day	Time	Activity	Tools Needed
Day 1	9:00 - 9:30	Opening and Introductions	Zoom
	9:30 - 10:30	Lightning Talks	Zoom/Miro
	10:30 - 10:45	Virtual coffee break	Zoom
	10:45 - 11:45	Panel	Zoom
	11:45 - 12:00	Second virtual coffee break	Zoom
	12:00 - 12:45	Collective Reflection: Understanding Decolonality	Zoom/Discord/Miro
	12:45 - 13:00	Closing Remarks	Zoom
Day 2	9:00 - 9:30	Plenary: Learnings/Thoughts from Day 1	Zoom/Miro
	9:30 - 9:45	Virtual coffee break	Zoom
	9:45 - 10:45	Collective Reflection: Thinking About Decoloniality in CSCW	Zoom/Discord/Miro
	10:45 - 11:00	Second virtual coffee break	Zoom
	11:00 - 12:00	Collective Reflection: Making Decolonial Paths for CSCW	Zoom/Discord/Miro
	12:00 - 12:50	Plenary: Learnings/Thoughts from Day 2	Zoom/Miro
	12:50 - 13:00	Closing and Next Steps	Zoom

will record the sessions and post them on the workshop website as a resource for the CSCW community beyond the workshop.

- Collective Reflections. We will organize participants in small groups and have them engage in three moments of collective reflections, each moment aligned with a workshop goal. Besides providing a video-conference space for groups to meet, we will motivate groups to use platforms such as Discord and Miro to support their collaborative work. Next, a description of the purpose and activities of these moments for reflection.
 - Understanding Decoloniality. In this first collective reflection, participants will share their motivations to join the workshop and will identify similarities and differences with their peers. We will reflect on how our particular perspective and positionality while doing CSCW research may contrast with assumed academic research frameworks. We do not aim to, nor encourage a rejection or negation of Western thought in the current CSCW research framework. Rather, we hope to enable a pluralistic view, one that includes a multiple and relational approach when conducting sociotechnical research. This activity will be conducted through an affinity diagram activity in small groups that we will create based on contexts of research, position papers, and participants' interests. After the activity, each group will share their diagrams with the rest of the participants.
 - Thinking About Decoloniality in CSCW. As mentioned before, this reflection will focus
 on collectively answer questions like How has the CSCW community and its learning spaces

been impacted by coloniality? and What would it mean for CSCW to deconstruct disconnections within its learning spaces and beyond? We will focus on identifying how coloniality takes form in the process of education, in the methods we use, and the forms of mentoring we practice. For this session, we will create three groups, one per each topic (education, methods, and mentoring). Based on their experiences, participants will create a matrix in which they will reflect and identify the current practices within each topic that may signify colonial practices.

- Making Decolonial Paths for CSCW. In this last collective reflection, we will focus on making decolonial paths that promote relational ways of seeing. Building on the previous two sessions, we will create a matrix of actionable items to promote decolonial practices within the CSCW community. These items will answer the questions of the for, the how, and the with whom, and what for when practicing decoloniality. We will conduct this activity in groups and then, discuss how each item will take different forms and relevance depending on the context.

REFERENCES

- [1] Mustafa Ali. 2014. Towards a decolonial computing. (2014).
- [2] Syed Mustafa Ali. 2016. A brief introduction to decolonial computing. XRDS: Crossroads, The ACM Magazine for Students 22, 4 (2016), 16–21.
- [3] Casper Andersen, Britta Timm Knudsen, and Christoffer Kølvraa. 2019. Methodological toolkit. (2019).
- [4] Ahmed Ansari. 2019. Decolonizing Design Through the Perspectives of Cosmological Others. *Inviting Young Scientists* 26 (2019), 16.
- [5] Ahmed Ansari and Raghavendra Kandala. 2016. The center and the periphery: beyond Eurocentrism. XRDS: Crossroads, The ACM Magazine for Students 22, 4 (2016), 7–8.
- [6] J Bidwell Nicola. 2016. Decolonising HCl and interaction design discourse: some considerations in planning AfriCHI. XRDS: Crossroads, The ACM Magazine for Students (2016).
- [7] Elizabeth Churchill, Jennifer Preece, and Anne Bowser. 2014. Developing a living HCI curriculum to support a global community. In CHI'14 Extended Abstracts on Human Factors in Computing Systems. 135–138.
- [8] Marisol de la Cadena. 2015. Earth beings: ecologies of practice across Andean worlds. Duke University Press.
- [9] Marisol de la Cadena and Mario Blaser. 2018. A world of many worlds. Duke University Press.
- [10] Rogério de Paula, Cleidson de Souza, David Millen, Marcos Borges, and David Randall. 2015. Doing CSCW Research in Latin America: Differences, Opportunities, Challenges, and Lessons Learned.. In Proceedings of the 18th ACM Conference Companion on Computer Supported Cooperative Work & Social Computing (CSCW'15 Companion). Association for Computing Machinery, New York, NY, USA, 297–302. https://doi.org/10.1145/2685553.2685560
- [11] Cleidson R B de Souza, Claudia López, Francisco J Gutierrez, Laura S Gaytán-Lugo, Marcos R S Borges, and Cecilia Aragon. 2018. Latin America as a Place for CSCW Research. In Companion of the 2018 ACM Conference on Computer Supported Cooperative Work and Social Computing. ACM, 401–407.
- [12] Tawanna R Dillahunt, Sheena Erete, Roxana Galusca, Aarti Israni, Denise Nacu, and Phoebe Sengers. 2017. Reflections on design methods for underserved communities. In Companion of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing. 409–413.
- [13] Enrique Dussel. 1994. 1492 El encubrimiento del Otro: Hacia el origen del" mito de la modernidad". Plural.

- [14] Arturo Escobar. 2007. El giro decolonial: reflexiones para una diversidad epistémica más allá del capitalismo global. Siglo del Hombre
- [15] Arturo Escobar. 2014. Sentipensar con la tierra. Nuevas lecturas sobre desarrollo, territorio y diferencia. Medellín: Ediciones UNAULA (2014).
- [16] Ramón Grosfoguel. 2011. Decolonizing post-colonial studies and paradigms of political-economy: Transmodernity, decolonial thinking, and global coloniality. *Transmodernity: Journal of Peripheral Cultural Production of the Luso-Hispanic World* 1, 1 (2011).
- [17] Francisco J Gutierrez, Yazmín Magallanes, Laura S Gaytán-Lugo, Claudia López, and Cleidson RB de Souza. 2019. Academic viewpoints and concerns on CSCW education and training in Latin America. In Proceedings of the IX Latin American Conference on Human Computer Interaction. 1–4.
- [18] Juan F Maestre, Elizabeth V Eikey, Mark Warner, Svetlana Yarosh, Jessica Pater, Maia Jacobs, Gabriela Marcu, and Patrick C Shih. 2018. Conducting research with stigmatized populations: Practices, challenges, and lessons learned. In Companion of the 2018 ACM conference on computer supported cooperative work and social computing. 385–392.
- [19] Walter Mignolo. 2011. The darker side of western modernity: Global futures, decolonial options. Duke University Press.
- [20] Walter Mignolo. 2012. Local histories/global designs: Coloniality, subaltern knowledges, and border thinking. Princeton University Press.
- [21] Walter D. Mignolo and Catherine E. Walsh. [n. d.]. On Decoloniality: Concepts, Analytics, Praxis. https://www.dukeupress.edu/on-decoloniality
- [22] Ezinne Nwankwo and Belona Sonna. 2019. Africa's Social Contract with Al. XRDS 26, 2 (Nov. 2019), 44–48. https://doi.org/10.1145/3368073
- [23] Anibal Quijano. 2000. Coloniality of Power, Eurocentrism, and Latin America" Nepantla: Views from South. In Ramose, MB, "Tranforming Education in South Africa: Paradigm Shift or Change?", South African Journal of Higher Education. Citeseer.
- [24] E-International Relations. 2017. Interview Walter Mignolo/Part 2: Key Concepts. https://www.e-ir.info/2017/01/21/interview-walter-mignolopart-2-key-concepts/
- [25] Andrew Thatcher, Lesley-Anne Katz, and David Trepess. 2000. Teaching CSCW in developing countries through collaboration. ACM SIGCHI Bulletin 32, 1 (2000), 63–66.
- [26] Lauren Wilcox, Betsy DiSalvo, Dick Henneman, and Qiaosi Wang. 2019. Design in the hci classroom: Setting a research agenda. In *Proceedings of the 2019 on Designing Interactive Systems Conference*. 871–883.
- [27] Heike Winschiers-Theophilus and Nicola J Bidwell. 2013. Toward an Afro-Centric indigenous HCI paradigm. *International Journal of Human-Computer Interaction* 29, 4 (2013), 243–255.
- [28] Marisol Wong-Villacres, Adriana Alvarado Garcia, and Javier Tibau. 2020. Reflections from the Classroom and Beyond: Imagining a Decolonized HCI Education. In Extended Abstracts of the 2020 CHI Conference on Human Factors in Computing Systems. 1–14.
- [29] Stuart Zweben and Betsy Bizot. 2020. Taulbee Survey. Computing Research Association (2020). https://cra.org/wp-content/uploads/2020/05/2019-Taulbee-Survey.pdf