Moving Towards Critical Pedagogy for Transformative Action: Learnings From Research Partnerships

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Abstract: This structured poster session brings together seven presentations from middle and low-income countries around the world. While research in the field of learning sciences provides some guidance as to how to design learning environments for transformative action, most of this research is conducted in economically wealthy parts of the world (United States, Europe, Australia). This session focuses on different approaches to critical pedagogy that lead to transformative action in unique cultural contexts across low and middle-income countries in the world. It also highlights the need for equitable partnership building between researchers, practitioners and community members that are engaged in transformative action.

Introduction

This structured poster session brings together seven research projects that have investigated the role of critical pedagogy in supporting transformative action within local communities in low and middle-income nations around the world. *The focus of this symposium* is the importance of transformative action as a framework to design learning environments for youth, so as to help them apply their knowledge to urgent problems faced by society (Curnow & Jurow, 2021; Gutiérrez & Jurow 2016; Kirshner, 2015). We present a set of papers committed to transformative action, in the tradition of Freirean pedagogy. Learning environments designed within the framework of transformative action challenge educators and students to critically think about issues such as: how can all voices and contributions in the learning environment be heard and honored; how can issues discussed in the learning environment center around social justice; how can knowledge generated in the learning environment be used by local communities so that the knowledge generation process has relevance to everyday life issues faced by the learners and their communities (Bangs & Davis, 2015; Jemal & Bussey, 2018). This work also builds on Freire's (1970) assertion that the educational process must interweave theory, reflection, and action as a means to advance the broader society towards social change and justice. This approach to the design of learning environments is particularly relevant in a moment in which the world is experiencing a series of concurrent crises—environmental, geopolitical, civilizational, economic, health—each with direct and profound effect on students. To respond to these challenges, school curriculum should not only give voice to students, but empower them as transformative agents in the face of political, racial, economic or cultural oppressions. Such curriculum can take the form of participatory action, service learning, arts-based learning, critical making, or others. The role of educators is a challenging one, as they must be agents who can help students parse through different sources of knowledge. The transformative action approach responds to research that suggests that emotional responses to situations perceived as oppressive and overpowering (e.g., systemic racism and other forms of discrimination, war, poverty, etc) might be alleviated by engaging students in some form of committed action (Charlés, 2010; Ridley et al., 2020).

While research in the field of learning sciences provides some guidance as to how to design learning environments for transformative action, most of this research is conducted in economically wealthy parts of the world (United States, Europe, Australia). There is a need and a responsibility for learning scientists to address learning in all of its forms and contexts, which can inform our deeper understanding of how learning occurs in diverse contexts and situations. We can also advance on the work of Freire and others in critical pedagogy, by examining these ideas in a set of studies. Putting such pedagogy into practice has been recognized as a great challenge, in part because of the need to engage student voice meaningfully and establish a democratic learning environment (Braa & Callero, 2006; Wink, 2005). These forms of engagement have proven to be a challenge even in high-income nations (Basu & Calabrese-Barton, 2010), with some hard-won advances made by educational researchers. But to succeed, teachers require substantial professional development, in order to engage students in autonomous, personally relevant forms of learning while still connecting with disciplinary content and practices, as well as critical thinking, inquiry, and creative expression. Lower and middle-income settings introduce an additional set of challenges, varying greatly in terms of their educational systems, local cultures, languages, and the specific issues that may be oppressive to students and local communities. The learning sciences bring a wealth of understanding about how to engage such diversity and sustain deeply situated learning, and the researchers in this symposium will present an array of studies that deliver on that promise. As a part of this structured poster session we provide examples of how critical action approaches were facilitated by teachers in Bengaluru, India; how educators at a tinkering lab in rural India connected materials and learning experiences in the tinkering lab to community problems; how science teachers in Guyana brought their socio-political identities to their classroom settings; how podcasting was used by youth in the Coeur D Alene nation to understand community based environmental problem solving; how education approaches in India need to include voices of marginalized (Dalit) students and their communities; how a youth led organization (Equal Education) creates powerful learning experiences for youth in South Africa; how education approaches in Brazil create a culturally relevant learning experience for learner.

Structure of the session

This session will be a structured poster event, with short (2-minute) presentations given by each project at the outset, followed by three 15-minute visiting rounds, where audience members choose one poster where they will join a discussion, and everyone switches to a new poster with each round. Each poster will include information about the partnership, relevant research, and findings about transformative action. At the end, the audience will return to a plenary mode for a 20-minute discussion led by Professor Chris Hoadley, from University at Buffalo. The audience will be engaged with a set of questions derived from our innovation sessions, described below.

This will be an innovative session, responding to the criteria listed in the Call for Papers. To *allow a wider level of hybrid activity* in support of all time zones, and *to allow for protracted discussion before and after the session,* we will engage all those registered for the conference (i.e., including those who signed up for online access) in a knowledge building activity before the session.

CALE: Empowering teachers in southern India in a professional learning community

Renato Carvalho, Preeti Raman, Jim Slotta, & Khyathi Vinay

This study was conducted in the context of a project called the Critical Action Learning Exchange (CALE). CALE is an international professional learning community (PLC) for educators dedicated to designing, enacting and sharing critical action curriculum that empowers students in responding to pressing, complex socio-environmental issues such as climate change, social justice, pandemics, and more. CALE draws upon the theoretical perspective of Critical Pedagogy, which is based on a philosophy of praxis that stresses the importance of an educative process that interweaves theory, action, and reflection as a means to advance the broader society toward social change and justice (Freire, 1970; Kincheloe, 2004; McLaren, 2000). This perspective is grounded on the concept of *conscientização*, which is described as "The process whereby people achieve an illuminating awareness of the socioeconomic and cultural circumstances that shape their lives and their capacity to transform that reality" (Freire, 1975). *Conscientização*, therefore, aims beyond "critical thinking" to include a sense of critical consciousness that enables students to make judgements on their current and ideal realities, and empowers them as agents for positive change. CALE applies Critical Pedagogy within a modern context of empowering teachers to help students overcome the sense of powerlessness regarding overwhelming socio-environmental issues, and feel empowered as agents capable of responding to those problems. Within CALE, teachers participate in professional development activities to develop understandings of Critical Pedagogy and collaboratively develop new critical action curricula. Over the past three years, we have designed the CALE activities, resources, and

technology environments to support our programs, tested our design ideas through cycles of implementation with teachers, and continuously improved our various frameworks and design guides to help CALE become a sustainable community of practitioners (Authors, 2021).

In Summer 2022, we organized a workshop in Bangalore, India, with the participation of 15 educators. Participants explored four "critical action approaches" using carefully curated materials and exemplars. Teachers' curriculum designs were guided by the CALE design framework for critical action curricula. This framework includes six components, divided into two axes. The "vertical" axis includes components intended to help students move deeper toward action—from knowledge, to criticality, to action. The "horizontal" axis increasingly expands the scope of the students' critical action—from the individual to the community and finally to the globe. Participants worked in small design groups and engaged in two cycles of peer review. This paper presents the specific features of our workshop, including materials and activities, as well as the pedagogical elements of provocation/activation and engagement through design. We investigate the efficacy of our model in supporting teachers' development of understandings of critical action pedagogy, as captured through teacher discourse, document and interaction analysis. We surveyed participants regarding their beliefs about professional development and their own practices, as well as their understandings of active learning and 21st-century competencies. Our data include teachers' survey responses and products of their design work.

We start from the hypothesis that some factors make it difficult for teachers to implement this change, such as the curricular expectations, which demand that teachers cover a broad range of topics and discourage the time-consuming deep exploration of topics needed for critical inquiry. The CALE workshop model provides a series of pedagogical and technological supports to help teachers overcome those barriers. These include the exploration of pedagogical approaches, the CALE curriculum design framework, and a curriculum design template. While "lack of time" and "fear of change" continue to be barriers to the implementation of CALE curricula in classrooms in India, teachers in our study were hopeful and motivated to integrate critical action into their curriculum. We look forward to sharing teachers' experiences and outcomes of enacting their curriculum designs in their classrooms.

Community based problem solving through technology design and collaboration in rural western India

Akshay Kedari & Devayani Tirthali

Rural students across the world find it challenging to develop interests and motivation in science and technology related topics (Harris & Hodges, 2018). Research focusing on students in rural schools showed that students, irrespective of their actual ability, tended to have weaker beliefs in their own academic ability and did not pursue additional educational opportunities compared to their suburban and urban peers (Young, 2000, Gilbert & Yerrick, 2001). In rural western India school is often perceived as an agent that introduces the youth to outside knowledge that is very different from the existing culture and tradition in the region (Jackson, 2003; Shiva, 2000; Goonatilake, 2001). As Pande (2001, pp 48) points out, "In their haste to run away from the village, the young men and women do not seem to have the time to understand their own village and their own people, nor do they receive any orientation towards this in school." For example, in Maichun Village in the Kumaon region of India, Palta was a community activity that involved the entire village coming together and making compost for their agricultural fields. The practice not only strengthened community bonds but also provided quality fertilizer for agriculture. Jackson (2004, pp 96) observes that "The young youth in the village do not see compost as a resource for sustainable agriculture. In fact, they are ashamed of working on the land: the girls for aesthetic reasons (nail paint would be spoiled and the compost stinks- were some instant remarks from girls) and the boys for livelihood (what will we do in the village? We go to the city, earn money and live comfortably- the boys say). Several families in the village now complain of declining agricultural yields, so much so that "food is not even enough for six months in a year." The example clearly points out that since most of the formal educational system does not focus on traditional practices, the sustainable livelihood in the village is impacted. Pande (2001, pp 51) also adds, "These impacts were too small to be noticed in the village in the early stages and when they became apparent and obvious for everyone to notice them, it requires resources, the time and knowledge to regenerate or improve them- a task that nobody in the village can do alone." Therefore, it is an important undertaking to design a curriculum that focuses on connecting school related work with community-based practices. In this paper we discuss a project that was conducted in rural western India that focused on how to make science and technology relevant to students' everyday lives and how to increase student interest in science and technology related topics. The study was built around the recognition that scientific expertise resides not only within school walls but also within the community itself. The project started with asking students to work collaboratively in groups so as to select a problem in their community which they could solve by designing a technology based solution. The students were asked to work

for about a duration of 6-months as a part of the tinkering lab they had in their school. The students were instructed to use as many tools as possible from the tinkering lab to design their prototypes. This project was carried out during the COVID-19 pandemic and therefore the curriculum that was implemented was designed taking into consideration that student attendance would not be consistent. The school shut down twice during the pandemic and a lot of the students did not have access to technology tools which made remote learning an impossible task. The project design reflected these concerns and designed a program that the students could attend face to face.

We measured student interest in science and technology related topics using a survey before and after the program. We also kept field notes during the 6-month period in order to document the process of how the students went about choosing, understanding and solving the problem that they perceived existed in their community. There were 13 students from 9th grade who participated in this project (4 girls and 9 boys). The topics that the groups chose were as follows: Group 1: The four girls decided to design an incinerator for disposal of used sanitary pads. This topic was chosen by the girls as availability and access to sanitary pads and a system for disposal of the pads is an urgent issue in rural India. The girls imagined this incinerator would be used in their community. Group 2: This group had 3 boys in it and they discussed the need to design a face lock system for doors in the community that they wanted to live in. The lock in the door would have a facial recognition software which would then provide optimal security for members of the community. Group 3: This group also had three boys and they worked on creating an automatic water tap in all the households so that there is less waste of water along with the convenience of having a water tap in the home. Group 4: The three boys involved in this group decided to design an electricity generator through the use of sewage water. The idea was to direct the sewage into a micro-turbine system that would then generate electricity. While most of the groups worked steadily towards their projects, group 4 struggled with conflict. The students in group 4 were not very interested in working on a project that involved community issues. The teacher had to step in several times so as to make sure the conflicts between the group members was at a manageable level. As mentioned above we administered a pre and post STEM interest survey. The STEM interest survey was adopted from a validated and reliable instrument designed to measure STEM interests among middle school students (Christensen & Knezek, 2017). We also used field notes to understand how students engaged with each of their projects.

Our findings suggest that we do not see significant shifts in terms of students' interests in STEM. While some students in the groups (n = 4) showed positive changes in their interest toward science in particular the shifts observed are not significant. However, our field notes suggest that the students were engaged throughout the process of the project. The COVID-19 pandemic also made it difficult for students to have steady engagement with the projects and may have contributed to showing no significant change in the interest levels. Given that this was our first attempt to make the ATAL tinkering lab relevant to the students' everyday lives we have several findings that will help us with our next attempt toward making the tinkering lab relevant to students' lives. Given that patience and perseverance are key factors to any kind of STEM work, in our next iteration we will emphasize that in any kind of STEM related work collaboration is a key aspect. Collaboration requires building trust, creating spaces for listening and being vulnerable. We will emphasize these important aspects of STEM related work. We are also in the process of thinking about how to emphasize patience and perseverance in our next version of making the ATAL tinkering lab relevant to students' everyday life.

The impact of the sociopolitical landscape on science teacher identity and science classroom discourse in Guyana, South America

Shakuntala Devi Gopal

Science education has historically had a tendency to call itself apolitical or neutral and consequently been unwelcoming to conversations surrounding injustice (Bazzul and Tolbert, 2019). However, funding agendas, cultural lobbies, and personal bias not only influence the direction and quality of science, but also what we teach about that science and then how that science is received by learners. This point is emphasized by Rodriguez (2017) who describes his own experience teaching students about the damage deforestation is causing to ecosystems and then later receiving angry phone calls from parents who worked in the forest industry. While he uses his story to examine the emotional demands of teachers who have social justice agendas, this research explores similar teacher narratives in Guyana in South America to highlight how teacher identity plays a significant role in how and what science is taught in the classroom, especially that with significant sociopolitical dimensions. This work specifically examines the sociopolitical factors that shape science teacher identity and how that identity informs pedagogical practices and classroom decision-making. Research on science teacher identity has established how identity can influence science teaching practices and pedagogical commitments (e.g., Helms, 1998); however, the relationship between science teacher identity and the increasingly sociopolitical nature of science education remains under-examined (Kokka, 2018). This relationship requires deep exploration given how important

connecting science to society has become in order to prepare youth for the complicated world they will inherit. Youth must not only learn to decipher scientific complexities, but also the social, economic, and political factors that influence decision-making. For example, learning how dams can generate hydroelectric power in lieu of burning fossil fuels is not enough to make informed dam-related decisions as dams also disrupt marine ecosystems (Scheer & Moss, 2012) and can impair the livelihood of marginalized communities (e.g., Mapes, 2020). So, this research asks whether science teachers see themselves as responsible for developing youth "critical consciousness" (Freire, 1970) i.e., the ability to recognize social realities that perpetuate inequities (Jemal, 2017), and why not if not. Conclusions drawn rest on the stance that a) science education plays a significant role in cultivating critical thinking skills in youth (Bybee, 2013) and b) teachers effectively serve as "agents of political socialization" (Bar-Tal & Harel, 2001, p. 122) in terms of how they choose to frame issues in the classroom, and what kind of learning ecologies they sustain (Authors, 2015). Using a qualitative research design, this study examines whether secondary school science teachers (1) position themselves as responsible for engaging student criticality in the classroom, (2) see a direct connection between their work in the classroom and national socio-scientific challenges such as climate change i.e., see themselves as sociopolitical actors, and (3) see science education as supportive of activism. Holland et al.'s (2001) concept of figured worlds and Davies and Harré's (1990) conception of positioning theory were employed to explore the social reality that Guyanese secondary school teachers are embedded within that shapes and informs how teachers position themselves in relation to this sociopolitical work of science teaching. 25 secondary school science teachers participated in a three-part semi-structured interview design (Seidman, 2013) where they were asked about their teaching practices, commitments, and history, and also the connections they saw between politics and their work in the classroom. Data analysis took the form of coding and thematic analysis (Saldaña, 2016) in order to locate structures, or moral orders (van Langenhove, 2017) that characterize and shape figured worlds (Holland et al., 2001). Initial analysis has revealed unique social, political, and historical context that shape tensions science teachers must then navigate. For example, one science teacher reflected on her struggle to use the color green when designing her classroom during a science unit that focuses on environmentalism because this color has historically been associated with a particular political party. Her use of this color risks asserting a false political allegiance which could alienate students along political lines. Furthermore, because political parties in Guyana are ethnically divided, she risks stoking pre-existing ethnic tensions within her classroom. This paper will share similar stories that highlight the social and political complexities that must be considered in science learning environments that aim to develop youth critical consciousness.

Voices to hear: Telling stories, listening to the present, and imagining the future

Sameer Honwad

Voices to Hear (V2H), a design-based research project that utilized oral traditions of storytelling, engaged Native American youth ages 12-25 in learning about complex environmental challenges faced by the Coeur d'Alene (CDA) nation. We believe that by asking students to reflect on environmental decision-making processes in their communities they, and we, will advance the practice of merging two different knowledge systems (Eurocentric-mainstream/dominant science perspective, and Indigenous – traditional knowledge) to resolve environmental problems, and enable sustainable decisions in their everyday lives.

Research has shown that successful environmental decision-making in Indigenous communities across the world involves combining both traditional and Eurocentric science knowledge (Penashue, 2006). This project aimed to spotlight the historical atrocities that have led to several environmental, social, and political consequences, and also embolden students to consider the ways they can be activists and community leaders (Ginder & Kelly, 2013). By the end of a multi-week summer program hosted by the CDA Department of Education, students create podcasts about environmental issues affecting their community that are direct consequences of colonization and exploitative practices by non-Natives on Native land. Podcasts topics included exploration of the heavy metal waste in the Coeur d'Alene (CdA) river due to extensive gold and silver mining, and the absence of salmon, a culturally important food source, because of the construction of a dam by Western corporations.

We used making high quality radio podcasts as a pedagogical approach to help youth understand how to engage with complex environmental problems in their communities. The use of high-quality radio podcasts was the chosen storytelling mechanism for two key reasons. The first is accessibility—podcast production and distribution is inexpensive and an almost universal medium. The second reason is that podcast making connects deeply with Native oral traditions. Of the modern media, podcasting comes closest to the original form of human storytelling: stories told "in the dark" with the pictures formed in the listeners' imagination. At the same time,

podcasts still uses the latest digital technology. While podcasting resonates strongly with oral story telling traditions, it also provides a mechanism for conducting scientific inquiry. The production of a five- or ten-minute high-quality audio documentary is a multilayered, labor-intensive process that emphasizes scientific inquiry, patience, and perseverance, requiring observation, data collection, analysis, and building a summary.

Through the podcasting process, students learned about environmental issues through the lens of different knowledge systems (Indigenous and Eurocentric) by hearing stories told by CDA Elders, explanations provided by natural resource scientists, and observations made by other community members. While the strength of podcast making is in resonance with Native American oral storytelling traditions for learning about and sharing with the rest of their community, the V2H process also provided a mechanism for conducting scientific inquiry and reflection on the inherent complexities of socio-scientific challenges. The podcasting process allowed youth to think about, ask questions about, and discuss the social and political dimensions of the environmental problems they explored. Podcasts were published on the CdA Department of Education website. This research examined student ability to systems think through the analysis of interviews, concept maps, and podcasts. Pre- and post-program data included student analysis of a pre-designed problem-based environmental story and concept maps as visual representation of the social, political, and scientific components that they saw as integral to solving the problem at hand. Data from podcasts focused on how students chose to represent local socio-scientific issues that are grounded in real-world complex systems.

We used the Core Values (CV), which draws on five core values (stewardship, membership, guardianship, scholarship, and spirituality) that reflect the worldview and heart of the CDA Tribal people, as the analytic framework. The core values as defined by the tribe are as follows: Stewardship: To care for all things with integrity, responsibility, accountability and social awareness in all spheres of life. Membership: Capable, decent, moral, 'a good person', a good citizen in your family, tribal, local and world community. Guardianship: Protecting tribal ways of knowing and being through the protection, care and responsibility for people, natural resources, culture, history, traditions, language and spirituality. Scholarship: Life-long, holistic learning with ideas rooted in tribal values, self-determination, self-government and sovereignty. Spirituality: Faith from which the Creator reveals the connection between all life.

The core values provide a culturally relevant framework to help us analyze and understand how CdA youth think and understand complex problems. Given the ways student participants were already embedded in a community with a rich cultural and environmental history, we aimed to leverage sociocultural worldviews and utilize pre-existing student schemas as cultural capital for systems thinking through our use of the CV framework. Framing the analysis within these core values highlights relationship, protection, and care. The V2H program enabled students to realize the interconnections within systems, as revealed in their interviews, stories, and the podcast narratives. The data showed that students value (1) caring that emphasizes responsibility, accountability, and social awareness in all spheres of life, (2) learning to understand the world by applying knowledge meaningfully in the community, and (3) care, responsibility, and protection for fellow people and natural resources. Meadows, Randers & Meadows (2004) posit that our increasing obsession with growth has resulted in the persistence of unsustainable environmental decision-making. We assert that CV, as a teaching framework, offers an ideal ideology approach to living that works to reinforce the notion that environmental systems are in a delicate balance which must be maintained in order for them to remain sustainable.

Making waves from the margins: Agency of students marginalized by caste in india

Ishita Pradhan & A. Susan Jurow

To design equitable learning environments, it is important to listen or read about the lived experiences in the voices of the people who are at the receiving end of oppressive practices. Educational experiences of students marginalized by caste system (Dalits) in Indian higher education have been documented well (Deshpande, 2006; Maurya, 2018; Pathania & Tierney, 2019; Singh, 2013), predominantly, these narratives did not include Dalit students' voices. The narratives, especially those presented by privileged caste researchers, advance deficit views of students from marginalized caste backgrounds. In contrast, we center Dalit students' voices to present their everyday experiences and interpretations of being in a space enduringly dominated by and imagined as a stronghold of privileged caste communities. Our initial question considered what it meant to engage with the dominant narratives about what it means to be a Dalit in spaces of higher education in India. As we gained insight into their everyday experiences of humiliation and marginalization, our research question shifted to ask: How does Dalit students' agency manifest in everyday actions and towards what ends?

The study was conducted virtually in Spring 2021 due to the COVID-19 pandemic. It was initially designed as an interview study, where Authors conducted online interviews (~80 minutes) with 6 participants,

who were a mixed group of Dalit students pursuing undergraduate, master's and doctoral studies in state and central universities across India, along with supplemental information from a focus group discussion (~90 minutes). Framing the participants as agentic individuals aware and in-charge of their voices (Trouillot, 1995), in control of their narrative, we approached the interviews as a co-constructive space where the participants recounted their experiences in their own words and Authors engaged in storying with the participants while reflecting on her personal experience of being a student in the Indian higher education belonging to the middle rung of the caste hierarchy.

The co-constructive nature of the interviews allowed Authors to listen to the participants deeply that helped Authors in discovering connections, reconsidering assumptions, develop and assess new ideas and pursue new directions in the inquiry of humiliation and agency manifested in the everyday campus life of Dalit students (Lareau, 2021). As a result of this deep listening, Authors identified a remarkable event during interviews, when one of the student participants spoke about a half naked protest at their university which received media attention from the local media channels. Authors subsequently searched through the YouTube channel of the local media outlet and identified publicly available videos where the student participant, along with fellow Dalit student activists, can be seen staging half naked protest for their rights. Therefore, for our research question, we use data from interviews, relevant information from the focus group discussions and YouTube videos to understand how Dalit students claim and articulate their community's humiliation (Nandy, 2009; Rawat & Satyanarayana, 2016) and use agency in everyday actions and towards multiple ends against the indignity and marginalization. The interpretive video analysis helps "seeing" frame by frame, gestures and actions to decode the social interaction (Knoblauch, 2012) among students, how they position themselves, each other and the institution in the act of protest and leverage embodied use of agency to transform the campus environment – implementing a university wide dress code, in this case. Using the framework of transformative agency (Engeström, 2015), initial analysis based on the interviews shows that Dalit students used their agency to organize change across multiple spaces and times. They strategically critiqued their everyday oppression and humiliation, and pushed the imposing limits of the institution to drive change in their learning ecology. Their bold actions brought awareness to caste-based atrocities and drove policy changes in their colleges. Students leveraged resources and tools such as, writing about caste inequalities and publishing in local magazines, collectively organizing events to celebrate lives of famous Dalit personalities, running study groups to discuss caste-based issues, use law (SC/ST Act) and access to local media outlets to challenge discrimination on campus. Their personal stories of organizing involved shifts in their sense of what was possible, what they were learning about higher education systems, and who they were becoming as historical actors (Authors, 2016).

The politics of "waithood" and designing for transformation: Learning to organize while confronting liminality in south africa

Tafadzwa Tivaringe & Ben Kirshner

Youth in South Africa have (re)emerged as powerful actors at the center of educational transformation. From organizing groups, such as Equal Education, to fallist movements, such as #RhodeMustFall and #FeesMustFall, young people are challenging unequal social structures and leading efforts to reimagine just and equitable education. While there is a growing body of research that documents such transformational efforts, less scholarly has attended to the kinds of learning environments that have (re)ignited political activism among this cohort of youth as well as their contemporaries in the global South, such as Nigeria, Brazil, Chile, and India (Espinoza & González, 2016; Kirshner et al, 2021; Tivaringe & Kirshner, 2021; Strong, 2018). Further, the scant body of work on designing transformative learning environments within the learning sciences has largely been situated in the global North, and is therefore yet to sufficiently grapple with the unique structural dynamics, cultural, economic, and political, that characterize the global South (Espinoza and González, 2016; Honwana, 2014; Honwana & De Boeck, 2005). This paper draws on ethnographic data of a South African youth-led organizing group, Equal Education (EE), which influenced the country's educational system by effectively compelling the government to adopt an equity-focused education policy. Building on our previous work that documented young people's framing strategies and learning trajectories (Kirshner et al, 2021; Tivaringe & Kirshner, 2021), we use this opportunity to carry out a focused analysis of the learning environment for a subset of the EE movement: post-secondary youth, here defined as high school graduates who are typically between 18-24 years. We exclusively focus on post-secondary youth because, as much literature on youth in the global South has shown, this cohort is often confronted with high levels of liminality, precarity, and marginality relative to peers in the global North. Conceptualized as "waithood" because so many post-secondary youth experience barriers to full employment, education, and economic independence (Honwana, 2014), this life stage and structural position presents unique opportunities and challenges for the design of learning environments that advance Frerian approaches to social

change. Confronted with a common challenge of shifting governance and leadership from founders to local actors, we observed that EE created transformative learning environments for political education, called "youth groups", in which post-secondary youth served as facilitators and community leaders. Youth groups, and indeed EE's broader learning ecology, were characterized by pedagogical practices that emphasized distributed forms of authority, embraced equity-centered spatial arrangements (e.g., reading circles), and drew on the legacy of the anti-apartheid movement and everyday practices to resist inequality in the education system. The youth-led movement developed a specific cohort model for post-secondary youth that combined political education, skill development in facilitation and youth organizing, and community building. Given the effectiveness of these features in empowering youth to navigate liminality, transform EE into a more democratic organization, and advance justice in the country's educational system, we argue that such a model has important implications on designing transformative learning environments across the globe.

Making as empowerment and community-building in the brazilian amazon

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Despite Maker Education's numerous contributions to education, such as the rekindling of constructionist, project-based STEM learning in mainstream systems, recent research has drawn attention to the fact that a considerable part of what happens in makerspaces reflect North American ideas, views, and epistemologies, having objectives implicitly rooted in the experiences of dominant populations (Buechley et al., 2008; Buechley, 2013; Vossoughi et al., 2016). Anthropologists, sociologists and historians have long documented varied and globally dispersed manufacturing and craft practices (e.g., Eglash et al., 2006; Mukhopadhyay, 2009). Inspired by works that merge such studies with considerations of making in education (e.g., Cavallo, 2000), and recent conceptualizations of cultural making, we designed a project in Brazil to engage with multiple communities to research their making practices and the diverse perspectives that underlie them. A team of 6 researchers was assembled, with deep ties to six Brazilian communities. The locations include two indigenous tribes, two *quilombola* communities (formerly enslaved people), a community of Afro-Brazilian weavers, and a Samba school. Our analysis for the symposium will focus on two communities of *quilombola* origin.

In the first community (clay pot makers in the Northeastern Amazon), the production of clay objects was deeply intertwined with spirituality. The collection of clay could only be done once a year under strict religious rules dating decades back. The interviews revealed that those rules served a variety of goals, from the practical (making sure the clay was collected exactly before the rainy season) to the political (assuring that the elders and the women remained protagonists in the process). The data also showed that the production of the clay pots was anything but routine or prescribed: despite the "official" production routine, each of the pot makers ("louceiras") reported having their own set of steps, innovations, and new ideas to optimize the process or make it more interesting--and reported strong self-efficacy in the process. For example, some devised a technique to leave the clay sun dry for several hours, while others swore by a different procedure based on fire drying. The clay pot making process was just one cog in a much more complex set of practices that were a key component in the well-being of the "louceiras," in which empiricism and religiosity were tightly connected: the spiritually-inspired procedures were seamlessly connected to highly empirical procedures. In a second quilombola community, a few hours away, women made cosmetics from native seeds. We also found seamlessly-integrated spiritual and empirical practices here with an additional and vital political component. The community leader reported that they had to organize and create an association to optimize production, which made them realize something entirely unrelated to cosmetics. Once they had an association, their voices coalesced into an amplified and powerful one. They were surprised to realize that, as a women's association, they could demand better local healthcare, transportation, and education from the local government. In this case, thus, the collective making of cosmetics indirectly empowered women to organize, find their voice and demand their rights. In the symposium, we will expand on such topics and discuss how making -- in its unsequestered version -- goes much beyond the creation of exciting objects, but is enmeshed in the spiritual and political realms of community life. However, the making that happens in most schools largely ignores that the production of artifacts in the world is connected to psychological, economic, and political aspects. We will discuss ways by which the creation of artifacts by diverse communities can inform and inspire how maker education is organized and conceptualized in our schools.

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