Research as Relational: Stories of ever-present learning between undergraduate research interns and project researchers

Sarane James, Macaulay Honors College at CUNY Hunter, Sarane.James@macaulay.cuny.edu
Lauren Vogelstein, New York University, lev226@nyu.edu
Jasmine Y. Ma, New York University, j.ma@nyu.edu
Sara Vogel, City University of New York, sara.vogel@cuny.edu
Wendy Barrales, The Graduate Center at City University of New York, ebarrales@gradcenter.cuny.edu
Laura Ascenzi-Moreno, City University of New York at Brooklyn College, lascenzimoreno@brooklyn.cuny.edu
Christopher Hoadley, University at Buffalo, tophe@buffalo.edu

Abstract: This paper consists of two stories that span three years of a learning sciences research project in order to demonstrate how 1) participating in this project shifted how undergraduate interns understood themselves as researchers and as practitioners within our project—and in other communities—in relation to our shared research; and 2) in turn, how the research practices in our project community shifted in relation to their participation. We leverage Lave and Wenger's (1991) legitimate peripheral participation framework as a way of showing how the learning and becoming of "newcomers" in a research community of practice can influence research practices within that community. As stated in the ISLS 2023 conference theme, this analysis helps us consider expansive ways in which we might want to "sustain our community" so we are becoming a community of practice where we make space for supportive and generous forms of relationality.

Introduction

According to Lave and Wenger (1991) learning is relational, becoming, and always happening. That means as researchers, our ever-developing practices of inquiry support learning as we grow and change with others. We take Lave and Wenger's statements to heart to reflect on what it means for a community of learning scientists working on a shared project to learn with undergraduate interns as "newcomers" to this community. In particular we consider relations between learning and identity at the intersection of multiple, sometimes conflicting, communities of practice in the context of the Participating in Literacies and Computer Science (PiLa-CS) project. We tell two stories that span three years of the project to demonstrate how 1) individual undergraduates' becomings in a learning sciences research community influenced their identity development in and across disciplinary contexts (e.g., creative writing and social science research) and 2) these newcomers' shifts influenced what counted as research practice in our community. Thus, we consider the importance of how our learning and becoming is intertwined through research.

Our stories feel important for learning scientists to contend with as we engage in research with newcomers all of the time, and as a field we are striving to broaden the ways of knowing and becoming that we engage in in our own research practices (Bang & Vossoughi, 2016; Zavala, 2016) in order to "sustain our community." Internships especially serve as a vector for communicating what it means to be a researcher, who is meant to take up that role, and what they are allowed to do as one. An exploration of the process of becoming a researcher and engaging in research from the perspective of individuals with marginalized identities in the field is critical to reckoning with how gatekeeping prevents the growth of new and established researchers and the community as a whole (Tanksley & Estrada, 2022). Tanksley and Estrada's work focuses on the ways in which the prioritization of whiteness as property and source of power affects the perceived legitimacy and authority of Women of Color researchers within Research Practice Partnerships. Our paper borrows the insider-outsider perspective to analyze how practices from other communities that are not held in esteem within typical research communities can change the course and character of the research done within a project when they are instead viewed as worthwhile and valid.

Analytic Framework

Lave and Wenger's (1991) legitimate peripheral participation (LPP) as a theory of learning disrupts many of the common conceptions of what learning is and how it happens. First, and most importantly, it posits learning as inherent in social practice, as opposed to an outcome of deliberate teaching. This means learning is *always* happening, whether there was an intention to teach or not. As learning is not the direct consequence of intentional teaching, what is learned in any given situation may not be at all related to what was intended to be taught. In this way, learning unrelated to a teacher's intentions becomes more visible during analysis. For example, undergraduate interns on a research project might pick up on ideas that it is possible and necessary to remove their biases from field observation, thus sanitizing the context provided by their own identities or experiences. Additionally, LPP rejects the idea that knowledge can be

abstracted, and that learning is about the acquisition of pure or "general" knowledge that can be applied in any and all situations. So even the proposition that one can "write objective field notes" is impossible according to these scholars. Instead, Lave and Wenger argue that all knowledge is situated in both the context in which it was learned and the specific circumstances in which it is applied, in contrast to theories of learning that posit that learning is the collecting of concrete knowledge in the brain. LPP focuses on learning as a result of the interaction between the people that are present as a community of practice. It is their interactions with each other that causes learning to occur. Thus, LPP asserts that learning is relational.

Lave and Wenger (1991) also put forth the notion that learning is becoming: that learning causes shifts in an individual's identity as they move from newcomer to old-timer, and since learning is *always* a result of social practice, a learner's identity is also always shifting. Furthermore, being a newcomer to a community of practice means that the assigned tasks may be simpler and much lower stakes, yet no less useful than those of a full participant and still contribute to the practice as a whole. On a larger scale, communities of practice shift their overall identity in the same way: as strangers are added to the community in the form of newcomers, they bring their own identities and practices to the pool, thus shifting the identity of the community as a whole. These new ideas sometimes align with those of the old-timers, and sometimes do not. Communities of practice often strive for continuity of shared practices, but the fact that old-timers are constantly replaced by "newcomers-turned-old-timers" guarantees a shift in practices as time goes on. Thus conflict between ideas and practices arise, and it is up to both newcomers and old-timers— who invariably need each other in order to maintain the community of practice, making their paths inextricably intertwined— to negotiate the shared future of their community. As we take the time to reflect on the sustainability and future directions of the learning sciences, we find Lave and Wenger's (1991) framework important for illuminating tensions between learning from the history and past practices within the field and our hope of expanding and shifting it towards more humanizing ends. In particular we seek to question the push to sanitize our humanity and perspectives from "sciences" in ways that work to separate them from our learning. When we understand learning as a form of becoming we can begin to conceptualize research as a process of learning in relation to and with others. As apprentices and mentors in the learning sciences, we seek to disrupt processes that assert the dominance of certain ways of knowing as rigorous and scientific and others as inferior.

Methods

Context

Our stories of learning come from the Participating in Literacies and Computer Science (PiLa-CS) project. PiLa-CS is an NSF funded grant that began in 2017 focused on partnering with teachers to integrate CS into their classrooms in ways that explicitly support bi/multilingual learners in developing CS literacies. Over the past five years the research community on the project has consisted of faculty member PI and co-PI's, postdoctoral associates, graduate assistants, undergraduate interns, and teacher partners who have come and gone and shifted roles within the project (e.g., Sarane was one of the first undergraduate interns hired on the project and is now the only intern working on it, and Sara began as a graduate assistant, became a postdoctoral fellow, and is now a research scientist on the project). The majority of the interns who have been a part of the project's history have been Women of Color, while those who were not came from other often marginalized backgrounds. The project itself has also shifted its focus, beginning with working in classrooms with teachers to develop and utilize a curricular approach for their students to now working on building professional learning communities consisting of teachers who can support each other to do similar work. Interns have worked on ethnographic data collection in classrooms, animation and graphics for pedagogical videos, and co-design of curriculum with teachers for their classrooms. They have supported logistics, materials creation, and workshop design for year-round teacher professional development and for a summer professional learning community (PLC). Interns also created storytelling artifacts to reflect back to teachers their generative learning trajectories as equity-oriented CS educators (e.g. editing data from a summer PLC into documentary episodes about teachers' learning). Many also attended project team meetings and gave ongoing feedback on project activities and writing.

Our stories come from the first two authors' experiences. I (Sarane, first author) am a Black girl from the Bronx. I grew up with a love of storytelling that, with help from a strong interest in anime and Japanese culture, had grown to encompass a fascination with language and its usage in general. I came to the project in the fall of 2019 as a freshman creative writing major. While taking a class on the Structure of Modern English, my professor posted a flier recruiting undergraduate interns from CUNY and NYU for the PiLa-CS project. I didn't know any Spanish, but I had spent four years learning Japanese, and specifically enjoyed learning about the structure of different languages and the way cultural values are reflected in grammar and vocabulary and vice versa. I had experience teaching Scratch during a previous internship, and this project seemed like an opportunity to delve further into language use in the

everyday and how it can be used in creative or non-standard ways to convey ideas to each other, even across language barriers.

I (Lauren, second author) am a white, Jewish woman from the suburbs of Chicago. I grew up with a love for creatively communicating ideas whether it was choreographing dances, reading autobiographies written by funny women, or choreographing to chapters from the audiobook of Bossypants (Fey, 2011). I came to the project in the winter of 2022 as a postdoctoral associate, fresh off of defending my dissertation (there were three days between my defense and starting this job as a postdoc; it was a quick turnaround and a big transition). As I was hurtling towards finishing up my PhD, I was on the job market in the Fall of 2021 and came across the posting for a new PiLa-CS postdoc. I was interested in joining the project because of its focus on expanding the multimodal resources for STEM learning, related to my dissertation research which focused on expanding sensemaking resources in STEM learning through choreographic inquiry practices. During my interview for the position I was enamored by the way both (co)PI's and graduate students asked and rephrased questions in generous ways, giving me multiple opportunities to express my thoughts. I was excited at the prospect of doing important equity-focused work in STEM education and becoming a member of a community that respected and lifted up the voices and concerns of all participants regardless of "rank."

Data

Data for this analytic storytelling came from Sarane and Lauren's lived experiences as newcomers on the PiLa-CS project. As part of reflecting on our experiences we also referenced and reviewed documented reflections undergraduate interns left behind before their time on the project ended, artifacts interns created as members of the research team (e.g. documentary episodes, website text), and recruitment flyers – all created over three years of the project. Our stories were told in conversation with what we heard and read from our undergraduate collaborators. We wrote our stories down, shared them unedited, and in the process of sharing them made comments to each other. As detailed in the next section, the data for the paper was co-created between Sarane and Lauren in the fall of 2022 (after the incidents in both stories occurred) through writing and commenting on stories about our experiences as newcomers on the project and thus our methods for data construction and analysis became closely intertwined.

Data analysis

The analysis for this paper began with multiple meetings in which we (Sarane and Lauren) reviewed artifacts from undergraduate interns' participation on the project and reflected on our experiences as/with undergraduate interns on the project. We read previous interns' reflections and detected themes in these gifts, such as feeling valued in this community, identifying as a researcher and a disciplinary practitioner in another field (e.g. undergraduate major), thinking about their majors in new ways as a result of their internships, and becoming a lodestar for other Black and Brown students that looked like them. As we started to collect quotes from various interns surrounding these themes, we found ourselves returning to stories from when we first joined the project that we had told each other orally. It was clear to us that our experiences as and with undergraduate interns on the project were consequential in shaping certain research pathways and differed from the collection of quotes we had accumulated. Influenced by Sarane's experience and history as a creative writing major we chose to take a memoir approach to our storytelling (Cannady, 2015). Whereas autobiography, its counterpart, focuses on getting facts exactly right, often by fact checking them to assure accuracy, memoir focuses more on a person's memory of the event and how it made them feel. Thus, in memoir, the stories that are told are tied explicitly to the identity of the author and how they interpret the world around them, making them extremely personal. Drawn to our experiences as forms of analysis we each created a written version of the stories we had shared about our experiences as newcomers. We then swapped stories, leaving comments on the other's story that highlighted noticings about our learning on the project.

Our methods for storytelling put practices from memoir into conversation with practices prominent in autoethnography. Autoethnography is often used as a way to directly oppose methods of cultural research that seek to scrub the researcher from the narrative, thus hiding the biases and/or insights that are an inherent part of their perspective. Instead, autoethnographers, especially those from marginalized backgrounds, seek to both write and analyze stories about themselves that illuminate the many shades of their lived experiences, and connect their individual stories to larger cultural narratives in a way that sheds new light on them (Ellis, Adams, & Bochner, 2011). One important byproduct of memoir as a method of storytelling is that memoirs can sometimes be little worlds of their own, causing an interesting phenomenon to happen when they come in contact with other people's viewpoints. In the work that inspired our methodology, Jennifer Lundan's *Evidence in Track Changes* (2016), this dissonance between the viewpoint of the author and that of her mother, who experienced the same moments but came away with a much different interpretation of them, became part of the text through her mother's comments on her writing. Even though their viewpoints contradicted each other often, neither were false, creating conflicting yet equally true realities. Our

stories don't conflict, but our different perspectives and life experiences provide for rich observations when they come in contact with each other. Sarane's story took place three years ago in the fall of 2019, when she was still a newcomer to the project, while Lauren's story was more recent (only 9 months ago in the winter of 2022), when she was a newcomer and Sarane was a more established member of the project. Commenting on each other's stories allowed us to bring our various expertise in conversation with each other in a way that allowed us to be newcomers and old-timers at the same time. Since our stories were about times in the project when we were newcomers, comments allowed us to share perspectives gained since we became older-timers in this and other communities.

Findings

Our findings consist of two stories with commentaries told and responded to by Sarane and Lauren. These unedited stories come from times when we were newcomers to the project, negotiating personally and communally what it meant to be a researcher and research in this particular community of practice. We encourage you to read through the stories in the following figures in any way that you please (Toliver, 2021) (1). This might entail reading through the primary, center story text once and then reading again and stopping to attend to comments as they pop up, or reading through both in a first pass. Both the stories and the dialogue through the comments are meant to be engaged with.

Story 1: Sarane's first experience as a researcher in the field

Sarane's story is about her first time conducting observations in a classroom with the research team in the fall of 2019, a moment that was consequential for her in coming to identify as a researcher and thinking about the phenomenon of study on the project (bi/multilingual learners' experiences in CS classrooms). You can find this story in Figures 1 & 2 along with Lauren's commentary and a few responses to these comments from Sarane (1). At this point we recommend reading story 1 as it is shared in Figures 1-2.

Figure 1
Sarane's story with commentary from Lauren and responses from Sarane (Part 1)

Figure 2

Sarane's story with commentary from Lauren and responses from Sarane (Part 2)

> Lauren - you were able to quickly discern that something was funny, insightful, or important but not necessarily WHAT was funny, insightful, or important. This makes me think about the relationships between language & expression, form & function, context & content

> Lauren - this sounds like a deficit for the team, but I wonder If it was also an asset that was hard to feel or see in the moment

> Lauren - identifying as a researcher feels important

> Lauren - this seemed to alleviate some off the stress and anxiety you experienced, I wonder if you connected this to similar present or absent structures for bi/multilingual learners in English only contexts, for example the important social structures here are framed as cheating on a standardized test

> Lauren - !!!! Very important insight. I'm curious if you felt like you were set up to fail in your job as an intern/researcher taking field notes in this setting and how that relates to marginalized language speakers in schools

After the lesson was over we stayed behind to debrief with Ms. S, and even then there were ways in which the language barrier made me feel like I was on the outside looking in. Our debrief was mostly in English, but a lot of the post it's students wrote their answers on were in Spanish. It was clear when everyone else found answers funny, insightful, or important, but my lack of Spanish knowledge meant I had to constantly ask for translations. It's always interesting watching people collaborate to translate ideas from one language to the next, but having to wait on a translation to be able to access the same sort of information that everyone else had made the experience much more frustrating.

Still, I was a researcher in that space, meaning not only had I helped design the lesson, I wasn't going to be quizzed or graded on my ability to understand what was going on. It was okay if a few post it's went untranslated or if I didn't fully understand what was going on, since I could lean on my team members to do the filtering and analysis for me. I realized very quickly that when we force multilingual learners into English-only contexts and classrooms, not only do they feel what I was going through in the moment— the being forced to divine what's going on in class from body language, scattered context clues, and little else— but we then expect them to do well on tests and other assessments based on what little knowledge they've gleaned. We judge their intelligence with metrics that were practically designed for them to fail. I left with the feeling that *no* student should have to go through a process as frustrating, isolating, and unfair as that.

> Lauren - are you saying that language barriers are learning barriers?

Story 2: Lauren's first introduction to the project's undergraduate interns

Our second story comes two and a half years after Sarane's first experience in the field as a researcher when Lauren joined the project as a postdoc, meeting Sarane and the other undergraduate interns for the first time during one of their weekly intern check-in meetings. You can find this story in Figures 3-5 along with Sarane's commentary (1). At this point in time we recommend reading story 2 as it is shared in Figures 3-5.

Figure 3

Lauren's story with commentary from Sarane (Part 1)

Note: this starts out as a story and then becomes a bit of a preachy memo, oops?

> Sarane - Valid. I don't always know what these mean off the top of my head either, but at the end of the day I think just like PiLa-CS they're mostly stand-ins for ideas and groups of people. I got introduced to them as the Justice League first, but, y'know, copyright law kind of stands in the way of that as an official name unfortunately.

I was in the middle of being oriented to the PiLa-CS project as a postdoc and the newest member of the research team. I went to what felt like a bazillion meetings, met so many new faces in zoom boxes, and felt overwhelmed trying to keep an ever expanding list of acronyms (like EECS and ECLEs, come on those are so similar) and ideas straight. The theory, the people, and the arrangement of capital letters were all new and it was a lot.

But I remember feeling calm, excited, and inspired after my first time attending a PiLa-CS intern meeting. It was my final first meeting on the project, the last group of people I met, so I was already at max capacity entering the meeting, but the stress seemed to melt away when I heard the interns sharing their work.

Figure 4

Lauren's story with commentary from Sarane (Part 2)

I don't remember all of the details, but I remember Danielle, a NYU film major at the time, shared an episode of the documentary she was working on for the project. Danielle had edited clips from project data in a teacher PD into a public facing documentary episode to share how teachers got to know their students and their students' language practices. Maybe it was Danielle's calm demeanor, or the soothing music she had chosen as the backdrop to the episode that helped ease any uneasiness I was feeling at the time, or maybe it was the clear evidence of how careful and thoughtful she had been with the responsibility of telling teachers' stories, the way she allowed the care teachers brought to their practice to shine on the screen. The care put into this video (am I using the word care too much?) made me feel like I was in good hands myself in this community.

My jaw was on the floor, this was beautiful, this was amazing. The conversations the team was having about how to tell these teachers' stories in clear and nuanced ways were just wonderful. Artistic research was being leveraged as academic research. Documentary filmmaking and editing are both artistic and research practices, something that I value myself and always try to bring out in my research on dance, choreography, and STEM learning. My new community not only got it but was making it happen in such meaningful ways. I was in awe, I felt like I belonged, and that there was a lot for me to learn in this space.

After being introduced to every corner of this project I confidently discerned that the most innovative work on the project was coming from undergraduates who were supported and given space to bring their passions and expertise to the project as forms of valued and rigorous research.

Over time as I got to know the interns and their work better I came to see how not only were their developing perspectives and expertise supporting the aims of the PiLa-CS research, but their involvement in the project was supporting their own development. I found this particularly striking with respect to their majors in school for Danielle the film major, Kyla the Computer Science major, and Sarane the creative writing major.

While Danielle was crafting documentary episodes, Kyla and Sarane were supporting a middle school teacher with curriculum development for her after school coding club. The ethical dimensions of coding were an important concern in the development of this curriculum as the teacher wanted to center what students cared about in the unit. Kyla saw a significant disconnect between the CS curriculum she was carefully developing and the CS curriculum she was experiencing herself as an undergraduate CS major. She openly questioned and critiqued her own course requirements, sharing that she felt like there was a big hole in the ethics of coding and becoming a coder in her own course requirements. How can a university turn out so many coders without ever asking them to consider the ethics of their work?

And last but not least Sarane, the heart and soul of the intern community and one of the longest running members of the research team was one of the most insightful thinkers I have been lucky enough to work with. It was and continues to be a common occurrence that Sarane's utterances are written down as key insights, or sometimes were even recorded as explanatory footage for Danielle's documentaries. When Sarane speaks everyones' ears perk up with extra attentiveness because we know her ideas are insightful and generative. This positioning, however, does not necessarily match Sarane's disciplinary expectations. She has shared with the project on multiple occasions that as a creative writing major her mentors have told her that she only has two relevant career options: (1) become an academic or (2) work in publishing. Yet on PiLa-CS her expertise as a writer has helped the research team in multiple ways from her insights as a collaborator to her written work on our website to share the meaningful stories from the project with others.

Sarane - I think I'm the sort of person who has grown up around a love of science and exploration my whole life. My mom used to buy those kiddy science kits and do the experiments with my brother and I as a kid, and my (brother's, technically) godmother gave me a real microscope and beakers and stuff like that as gifts. I think, especially going to a school like Bronx SCIENCE that valued science and math more than other things, I got really jaded about the positionality of the humanities vs the sciences in our society? So my instinct whenever I get told a "truth" about the sciences-- for instance, what should or shouldn't count as computer science-- my first instinct is always to push back against it. I think it's felt like "fighting" the idea of academic research, but seeing it posited almost as a different approach, a new way of getting at the same thing, feels... good? Yeah.

Sarane - Again related to the essay I wrote in the comments above (oops), but this is the thing about the way we talk about science majors. Obviously I'm not one myself so I don't know what those conversations are like from the inside outside of my high school experience, but there's almost this feeling like "what we're doing is smart and noble and important and things like English or philosophy or literature are a waste of time," and I think it creates this environment where it's OKAY to not think about ethics or the real-life affects of your work on different populations as long as you're creating something innovative and new. And it feels like you SHOULD be taught to value history classes, or English literature, or even philosophy, because how else are you supposed to know the historical ways in which tech and innovation has hurt people and thus avoid replicating it yourself? Then again, if you don't care who you hurt, then what do those things matter?

Sarane - Wendy's intention from day 1 as part of the team has been about telling marginalized peoples' stories in ways that is both respectful to them and values their input above all else, and is in conversation with ideas of storytelling as a form of protest that have been developed by Latinx artists and thinkers called testimonios. Her insight into building off that work respectfully have been integral to the team as we share the stories of our teachers, and I think no one has taken up that mantle more than Danielle and her documentary episodes. There was a lot of pressure and expectation (and love and support, obviously) surrounding what we hoped to get out of these videos and I think she took all of that and made something really beautiful!

Sarane - I guess the point of my whole big comment above is that the thing you clocked instantly didn't feel to me like we were using art as research? Not that we WEREN'T doing that, but to me it felt like as much as we call it a research-practice partnership, and we had to go through the whole research certification process to work with kids and such, it still felt to me almost like we were being allowed a space to do artistic things where we would usually be made to do research instead. And I think the fact that your perspective allows both the research and the art to be one and the same and starts from a place where they're equally valuable is really amazing.

Sarane - Capitalization

Figure 5
Lauren's story with commentary from Sarane (Part 3)

While I know I might be constructing a bit of a straw man by saying that all or most undergraduate internships have undergrads getting people coffee or doing menial tasks, it's a cliche for a reason. Right? And I just think it's so important for us to share how this project has supported and benefited from engaging undergraduate interns in authentic means of research that were not pre-defined ahead of their arrival. The disciplinary and personal perspectives these interns have brought to the project have enhanced the rigor of the research of the project by allowing us to expand what counts as research practice and product. And it seems to me that by applying their developing disciplinary perspectives to a new context has helped them understand their developing disciplinary identities and utility in new and productive ways.

I think as a postdoc, someone who had recently been deemed "an expert" or whatever that means in one setting and then coming into a new setting where applying this expertise was one of the primary objectives, I was especially attuned to this idea of developing expertise across settings. As I was building relationships with the PiLa-CS team members I was myself feeling how applying what I knew in a new setting could be destabilizing. For me it led to spirals of insecurity and imposter syndrome, <u>"was I only smart because the context I was in in grad school constructed me as a smart person? Because in this new setting I feel like I can't quite do and be that same person."</u> Yet I observed the interns developing a more empowering stance, in which their disciplinary identities became their super powers. This helps me see other ways I've learned from the interns, but also makes me wonder about the emotional and potentially destabilizing journeys they went on themselves.

> Sarane - Oh boy, I have this conversation with my mom all the time where it's like no matter what I've already accomplished, I'm still really surprised when other people see me as a valuable voice or member of the team. I didn't comment on the paragraph above because I spent the whole time blushing, but I think over the years I really have internalized the idea that the degree I'm getting and the path I'm taking will only be useful in specific contexts? And the more time I spend with PiLa-CS getting to experience all sorts of different roles I never thought I would be ready or fit for, the more I manage to slowly unlearn that. It frustrates my mom because she's my biggest cheerleader and she's ALWAYS told me how amazing and capable I am, and I think sometimes she would rather I hurried up in coming to that conclusion myself, but y'know. Things take time.

> Sarane - All of that to say I think you've dived feet first into PiLa-CS and really made the space your own as well! Maybe it's related to your background in both the scientific and artist space, but I think you immediately brought your perspective and your personableness to the team in a way that's been really soothing. Even outside of your academic work, which has been great to be a part of, I think you're just friendly and open in a way that makes it not just easy but also a relief to connect to you. I've been dealing with a lot of stuff mental and physical health-wise this past year, and while I've always been an open person I think I'm still learning to be vulnerable? And the rest of the team has always been kind and accepting and I'm eternally grateful for it, but I think you exude empathy just in the way you move through the world and that has truly been a balm. I'm gonna stop typing before I tear up, but seriously, THANK YOU for being a part of this team.

Discussion Conclusion

The structure of our methodology means the discussions around these stories are recursive. Each layer of analysis becomes fodder for new conversations, preserving our thoughts and feelings and allowing us to build on them in the future, serving as artifact and analysis at the same time. Similarly, LPP (Lave & Wenger, 1991) posits that shifts in identity and practices are related as the relationships between newcomers and old-timers change over time.

Undergraduate Interns' Shifts in Identity Inside and Outside of Our Research

These stories helped us crystalize how undergraduate interns' identities with respect to our research community and to their "major discipline" communities shifted in relation to each other. For Sarane, her emerging identity as a researcher was in direct conversation with her identity as a writer. Some of these tensions came out in her story, sharing how when she first joined the project she felt "strict boundaries between things like writing and research." Yet, Lauren saw lots of connections between Sarane's practices as an established writer and emerging researcher, such as feeling most comfortable writing field notes but feeling conflicted about trying to remove her perspective and bias to take scientific, "objective" ones. Lauren wrote about how Sarane repeatedly shared the limited career paths she had been told were possible as an English major (teacher or publisher) and contrasted that with how Sarane's writing practices have been used to write material for PiLa-CS's website and for our methods in this analysis. Sarane is a central and successful member of the PiLa-CS research team, evidence that her writing practices can be generative and productive outside of those pathways. Lauren also shared how Kyla began to question why ethical considerations were taken into account in the CS curriculum she was co-developing for middle schoolers but not for undergraduates like herself. For Kyla, being a computer scientist now meant needing to think about the ethical implications of her work, and not having formal spaces to think about this in her coursework increasingly frustrated her. The confluence of multiple identities within the context of our research community led to the emergence of new, critical perspectives on disciplinary practices for the undergraduate interns such as Kyla's questioning of her university's CS curriculum and Sarane reclaiming the power of reinstating her perspective, "the I in research," into her academic writing.

Our Research Community's Shifts in Relation to Undergraduate Participation

The research practices we engaged in as a community also shifted. Sarane wrote about attending to body language when she felt lost on her first day of field work and Lauren commented on the connection between Sarane's experience and the PiLa-CS team's shifts in theorization: conceptualizing translanguaging in terms of a larger range of multimodal communicative resources (e.g., gesture, emojis) and not just verbal language use. The intern projects, such as Danielle's documentary episodes and Kyla's identifying as a CS teacher interactive timeline, also became new forms of analysis. These analytic artifacts had a meaningful impact beyond the usual formal academic papers in our project team and our dealings with practitioner partners. Seeing how teachers reacted to having their stories told back to them was a highlight from our PD work together. Lastly, the methods and structure of this paper developed out of changing research practices in our team as autoethnography morphed into writing memoir-like excerpts with each other.

As our practices grow and shift so does our attunement to the importance of relationality in learning. We found while engaging in these new research methods that what we shared became more personal, making salient parts of ourselves that had not seemed so before. This was present when Sarane shared stories about insecurities her mom tried to help her unlearn in response to Lauren sharing insecurities about her imposter syndrome in her story. Sharing and commenting on each other's stories was a vulnerable process that sometimes felt scary and uncertain. It took a lot of reassurance and conversations before we felt comfortable sharing them with each other, yet what came from our sharing and comments brought value to bringing our perspectives together. We reassured each other about our contributions to the team, whether theoretical or interpersonal, through our comments. In the process of crafting this paper we continued to grow and learn from each other because learning is always happening as a relational enterprise and thus new forms of relationality are always blossoming. We are excited at the prospect of cultivating these supportive and generous forms of relationality, something we feel should not be taken for granted in research contexts.

Conclusion

As Lave & Wenger (1991) posit, learning is relational, becoming, and always happening. Thus it is not a surprise that undergraduate interns' identity development in the context of their internship was tightly connected to observable shifts in research practices within our community of practice. Since internships are often vectors for communicating what it means to be a researcher, it is important for research communities to reflect on and make explicit how interns contribute to shifts in research practices. This has allowed us to collaboratively reimagine what counts as research using both the goals and experience of senior project members and the interests and expertise of interns. Senior members of the team trusted undergraduates as experts in their major discipline while also widening the potential applications of these disciplines, allowing their contributions to meaningfully affect the future of our community.

Endnotes

(1) We have replicated the text of our stories and comments in a google doc so that anyone who uses a screen reader can read it with ease. https://docs.google.com/document/d/1_xQvK_veyVp-6RjbZAwBTnneV2MLBYjf/edit

References

Bang, M., & Vossoughi, S. (2016). Participatory design research and educational justice: Studying learning and relations within social change making. *Cognition and Instruction*, *34*(3), 173-193.

Cannady, L. J. (2015). Crave: Sojourn of a Hungry Soul. Etruscan Press.

Ellis, C., Adams, T. E., & Bochner, A. P. (2011). Autoethnography: An overview. Historical Social Research, 36(4), 273–290.

Fey, T. (2011). *Bossypants*. Hachette UK

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge university press.

Luden, J., & Sartre, D. (2016). Evidence, in Track Changes. *Diagram*. https://thediagram.com/17_3/lunden.html

Tanksley, T., & Estrada, C. (2022). Toward a Critical Race RPP: how race, power and positionality inform Research Practice Partnerships. *International journal of research & method in education*, *45*(4), 397-409.

Toliver, S. R. (2021). *Recovering Black storytelling in qualitative research: Endarkened storywork*. Routledge.

Zavala, M. (2016). Design, participation, and social change: What design in grassroots spaces can teach learning scientists. *Cognition & Instruction, 34*(3).

Acknowledgements