Hack for the Future: Adolescent possible self identification in community-centered learning design

Emily G Anderson

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Philip Bell

Katie Headrick Taylor

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Abstract

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Chair of the Supervisory Committee:

Philip Bell

Department of Learning Sciences and Human Development

Technology education consistently fails to serve non-dominant communities, contributing to inequities in the technology industry and reifying disparate social stratification. Addressing this issue requires creating opportunities for non-dominant communities to envision themselves within the discipline and develop future self-concepts in technology contexts. This research study investigates how community-centered learning design supports possible self identification in adolescents. Using a design-based research approach, the study examines the dimensions of community-centered learning design which foster identification of aspirational selves. Findings reveal that possible self identification is facilitated through navigation knowledge that bridges current self with a possible self, guided by community-centered design concepts. This work highlights the potential of technology curricula and learning spaces centered in community values to foster possible self identity development in non-dominant communities and promote more equitable participation in technology fields.

INTRODUCTION

Hack for the Future is a design-based research study exploring the impact of community-centered learning design on adolescents' possible self identification (Markus & Nurius, 1986). Designed to emulate a hackathon–a popular event in computer science education and industry where teams collaborate intensively over a short period of time to develop technological solutions, typically software, to solve a challenge – Hack for the Future tasked participants to ideate on a technological solution for an issue directly impacting their communities. Conducted by educators and workshop facilitators who exist in community with the participants, this free workshop aims to examine community-centered design strategies for adolescent development of possible self identification in disciplines which lack active representation of their lived experiences and cultural backgrounds.

The rapidly evolving technological landscape of modern society has set in motion a cascade of changes, the full consequences of which we are only beginning to witness. From my vantage point as an active technologist in the field, the hegemonic perspective and homogeneous identity in industry presents a concern as technology continues to alter societal structures, job opportunities, and the essentials of everyday life. We must critically examine whether an envisioned future for all can be realized by the efforts of a few–and when the inevitable answer is no, we must then explore how to create opportunities and pathways for broader participation and contribution. One such pathway involves customized design of technology education to resonate with adolescents from communities underrepresented in industry; thereby, linking identity to disciplinary practice and building cognitive bridges between current and possible self.

I argue the equity gap in the technology sector begins in the classroom and leads to the statistically significant representation gap in the professional industry. Discrepancies in access to

technology and computer science education in public schools across the United States contribute to a homogenous population in undergraduate computer science and engineering programs. The annual State of Computer Science Education report published in a collaborative effort by Code.org Advocacy Coalition, Computer Science Teachers Association (CSTA), and Expanding Computing Education Pathways (ECEP) Alliance highlights 60% of US public high schools offer at minimum one foundational computer science course; leaving 40% of the nation's high schoolers without access. The report elaborates on this impacted group, noting that schools that serve "students from racial and ethnic groups historically underrepresented in computer science" and "a higher percentage of students qualifying for free and reduced lunch" are generally less likely to offer even one computer science course (2024). This access discrepancy in school directly impacts job opportunities in a lucrative and growing professional industry. In a 2020 study conducted by Deutsche Bank and led by global technology strategist, Apjit Walia, findings highlighted the glaring problem that Black and Hispanic communities could get shut out or be under-prepared for 86% of technology-centered jobs in the US by 2045 (Walia, 2020). The consequences of excluding demographics of society from the ground floor of technological innovation appear in the output of these algorithms. There are reported instances of generative artificial intelligence models exhibiting racial, gender, socioeconomic biases and discrimination; contributing to the reification of disparate social stratification as the status quo (Hale, 2021; Heaven, 2020).

To address this privilege-based barrier within the industry, it is essential to critically examine the inaccessibility and disconnection inherent in the current technology education landscape, particularly in its ability to relate to underrepresented communities effectively. Curating learning environments centered in connecting participants' lived experience and current

identity to a future disciplinary self serves as a meaningful and necessary step to fostering a possible self identity for members of historically marginalized communities (Fan et. al, 2023). This study explores a practical implementation of such a program–which upon successful implementation results in possible self identification and advancement opportunities in the field of technology, and broader professional sphere.

LITERATURE REVIEW

The intervention design aims to explore how a community-centered, participant-led learning design supports the matrix of possible self identification in adolescents. The design is grounded in social practice theory and situated in Markus and Nurius' "Possible Selves" theory of psychology which focuses on the subdomain of self-knowledge pertaining to an individual's belief in their potential and their future (1986). Hypothetically, ideating possible selves is an unbounded developmental process only limited by the imagination of the self; but in reality, we understand that individuals exist within the context of history and sociocultural identifiers which constrain the pool of possible selves that one believes to be attainable for someone of their background (Meyer, 1985). The construction of the self, and future selves, is deeply influenced by social determinants and constrained by the hierarchical structures embedded within society. Underlying power dynamics generate societal patterns and stereotypes which shape individuals' perceptions of what is possible for their own potential and future. Socially constructed categories such as race, gender, and class interact with institutional and cultural norms, often limiting the range of identities individuals feel empowered to adopt. As a result, individuals may internalize societal expectations, which restrict their aspirations and perceived agency in shaping their future trajectories. To combat the limitation of possible self development, providing accessible social experiences and environments which contradict sociocultural expectations may expand an

individual's frame of reference and foster a new sense of futurity. While it is difficult to empirically establish that self-knowledge, and more specifically an aspirational possible self, are definitive regulators of behavior due to the multitude of factors influencing individual actions, the concept of possible selves offers a valuable cognitive framework for understanding future-oriented motivation and behavior (Markus & Nurius, 1986). By envisioning who one might become, individuals can construct aspirational identities that serve as guiding reference points. These imagined future selves create a sense of personal relevance and urgency, fostering intentionality and providing motivational pathways that can drive goal-directed action. In this way, possible selves can function as psychological incentives that spur individuals toward the realization of long-term goals.

The connection between Markus and Nurius' theory of possible selves and the fields of education, learning, and development is well established in scholarly literature. In light of the consistent focus on STEM pathways and the persistent equity gap in related industries, recent research has turned its focus toward the development of STEM possible selves in adolescence as a strategy to address this disparity in future generations of scientists, technologists, engineers, and mathematicians. Studies underscore the critical role of early STEM exposure, demonstrating that activities such as hands-on learning, mentorship with STEM professionals, and career exploration events significantly enhance students' perceptions of their own potential in STEM careers (Redick, 2023). These experiences enable students to construct future-oriented STEM identities, which in turn serve as cognitive and motivational frameworks, guiding their aspirations and career trajectories. Moreover, targeted interventions are especially vital for underrepresented groups. Research analyzing the identity development of minoritized students and alumni highlights the need for intentional programming that fosters ongoing STEM identity

formation during key developmental phases, particularly early career exploration (Fan et. al, 2023). Fan, Barany, and Foster's work showcases that building a robust STEM identity not only informs long-term career goals but also emphasizes the necessity of inclusive environments where minority students can explore and integrate their possible selves into a STEM identity (2023). These efforts are crucial for promoting equity and broadening participation in STEM fields.

A model of disciplinary identification is provided by Van Horne and Bell's work in project-based science investigations (2017) to elucidate how learning pathways towards a disciplinary identity are paved by "one's interests and from personal or collective concerns, challenges, or desires," (p. 443). Connecting learning to participants' current identities and lived experiences while concurrently deepening participation in epistemic practices are essential elements in the nexus of disciplinary identification–demonstrating the significance of designing learning environments around participants' identities. Designing for "material, relational, and ideational identity resources and qualities" (p. 471) within the learning environment opens entry points for participants to begin the process of stabilizing a practice-linked identity. Community identification and interrelation function as dynamic entry points for this stabilization process by connecting participants' individual identities to a collective identity; and actualizing disciplinary pathways connecting current to future self through navigation knowledge and practical guidance. Navigation knowledge is a prime mechanism for transforming interest into sustained disciplinary identification and, ultimately, the realization of possible selves (Van Horne & Bell, 2017; Bell et al., 2013). It is my intention to explore how engaging in these epistemic practices in a community-centered learning design, facilitated by adult community members embodying realized disciplinary identities functions in the process of possible self identification.

To call forth a historical implementation of community-centered learning, I turn to the Oakland Community School initiative led by the Black Panther Party in the United States during the mid-twentieth century. The Black Panther Party was founded by Huey P. Newton and Bobby Seale at Merritt College in Oakland, California in October 1966 as a response to the assassination of Malcolm X and the unjust murder of Matthew Johnson, an unarmed Black teenager by San Francisco police. Newton and Seale surveyed their community on the top issues of concern and compiled the results into a Ten-Point Program (National Archives, 2016) to serve as the governing document and guiding principles for the multitude of community-based programs which would emerge from the Party. The Oakland Community School initiative derived from Point Five of the Ten-Point Program:

> We want education for our people that exposes the true nature of this decadent American society. We want education that teaches us our true history and our role in the present-day society. We believe in an educational system that will give to our people a knowledge of self. If you do not have knowledge of yourself and your position in the society and the world, then you will have little chance to know anything else. (Black Panther Party, 1966).

This critical tenet emphasizes the importance of education systems which instill a sense of self in the learner and provide critical perspective on how their individual and collective identities relate to the larger society. The Black Panther Party regarded the development of dignity-conferring education for Black youth as an indispensable cornerstone of their mission and recognized it as a potent tool in their fight against entrenched systems of oppression deliberately constructed to stymie progress and relegate Black Americans to a subordinate societal status. This focus on community-centered, identity-driven education served as a

deliberate and strategic countermeasure–aiming to empower and uplift the Black community against the systemic barriers designed to hinder their advancement and limit their potential. Manuel Luis Espinoza and Shirin Vossoughi's research on Perceiving Learning Anew: Social Interaction, Dignity and Educational Rights (2014), underscores the significance of leveraging education as a means to break down systemic barriers:

> Under circumstances of extreme and invidious constraint, learning has the power to 'unfit' individuals from subordinate social status. Insofar as learning helps persons and selves flourish, it is dignity-conferring. Dignity can be derived from productive participation in the process of learning. Although perilous, it can also be acquired from resistance to the inaccessibility of the opportunity to learn. (Espinoza & Vossoughi, 2014, p. 287).

Oakland Community School's lessons focused on fostering knowledge crucial to identity development and self-determination. Students were introduced to influential role models and prominent figures whose identities resonated with their own, including Rosa Parks, Maya Angelou, and James Baldwin. Annual student-led productions were organized, serving as platforms to nurture leadership skills and challenge conventional power structures within educational settings. Teachers and staff placed a premium on fostering strong interpersonal connections with students to bolster both their academic achievements and personal development. While the Oakland Community School closed in 1982 due to lack of funding and government harassment, it's legacy lives on through the Oakland Unified School District's implementation of Community schools; specialized schools which embed local community organizations on campus to provide mental health support, food, academic help, after-school programs, and other resources to the student community. The sentiment of the modern

Community schools harkens to Indigenous ways of knowing which recognizes education as “the means by which communities transmit knowledge intergenerationally and maintain social cohesion,” (McCoy and Villeneuve, 2020). Much like the challenges faced by the Black Panther Party, leaders within the Community Schools movement have grappled with persistent hurdles in securing steady government funding and support. This is despite ample quantitative research underscoring the undeniable positive impact of these educational frameworks on crucial metrics like dropout rates and achieving proficiency in reading at grade level (Mojadad, 2023).

Through the journey and legacy of the Oakland Community School, one indisputable truth remains: irrespective of the American government's stance on supporting such frameworks, the model established by the Black Panther Party stands as a profound testament to the pursuit of educational rights through dignity-conferring, identity affirming and empowering learning experiences. From this lens, it is imperative that equitable technology education be developed with specific intention to empower students from marginalized communities to critically examine their identity within a critical historical view of societal contexts and explore their potential impact on the tech landscape. This approach aims to instill a sense of agency and awareness, fostering a generation equipped to navigate and shape a more inclusive technological future. While engaging with the totality of the Oakland Community School initiative, it is essential to acknowledge the alignments and contradictions that emerge while exploring the application of insights from the initiative to the creation of technology education. While both implementations share the overarching aim of empowering learners from marginalized communities by fostering an understanding of their identity within society to nurture self-determination; a pivotal distinction lies in the fact that the technology workshops are purposefully crafted to guide students toward careers within the corporate, for-profit tech industry. It is crucial to acknowledge

the anti-capitalist beliefs held by the Black Panther Party juxtaposed with the inherently capitalist nature of the technology industry. Where the Black Panther Party attempted to divest from capitalist society, the intention of equitable technology education is to invest–to expand the earning power and technological influence of marginalized communities. As a critic of capitalism personally, the intended approach is supported by the commitment that it is possible to affect meaningful change from within a system. Empowering communities within the technology industry expands power-laden decision-making authority and opens up spaces for potential transformation of systems and practices.

Lave and Wenger's work on communities of practice (1991; Wenger, 1998), the social and collaborative nature of meaning-making and identity development, provides context for the compounding approach of possible self-identification within the context of community-centered learning design. Intentionally designing for gradual engagement, from the periphery to full participation, in community practices facilitates acquisition of knowledge and skills while concurrently shaping how individuals see themselves in relation to the community and the discipline (Lave & Wenger, 1991). Facilitating opportunities for learners to take on roles in community which align with their aspirational self encourages the exploration and identification of possible selves within a supportive and dynamic social context; and reinforces their self-concept as capable of achieving the desired domain identity (Wenger et al., 2002). By situating learning within the cultural and social fabric of the community, participants can develop identity, belonging and motivation (Bang et al., 2013; Bell, et al., 2012) towards a possible self.

The development of possible selves is significantly shaped by social experiences and contexts. Integrating a community-centered approach into this intervention offers an opportunity to solidify participants' possible self identification by grounding it in their lived experiences. By

embedding identity exploration within community-driven design, this intervention explores how to design a supportive environment where underrepresented youth can actively envision their aspirational selves within the technology discipline. Reinforcing the attainability of a possible disciplinary identity through community action and belonging can open tangible pathways to these futures.

METHODS

This design-based research study (Bang & Vossoughi, 2016; Brown, 1992; Design-Based Research Collection, 2004), grounded in social practice theory, used interaction analysis (Jordan & Henderson, 1995) to examine how community-centered learning environments support adolescent possible self identification in the context of the design and implementation of a project-based technology learning environment.

Learning Environment Design overview

Hack for the Future was designed to foster a community of practice amongst participants and emulate an authentic technological development environment enabling the ideation of possible selves identification. This three-session, 5-hours per session, intervention executed over the course of one week encouraged participants to leverage technology for the betterment of their community. The workshop was offered through a local community college's bridge program, known as the ASPIRE program, through their annual summer programming for local youth.

Table 1. *Hack for the Future* Workshop Agenda with numbered Activities

Session 1 Community college campus	**Session 2** Community college campus	**Session 3** Professional technology campus
(1) Introductions **Data collection:** Consent forms, Participant assent, and Pre-survey	(7) Morning check-in **Data collection:** Participant assent	(10) Morning check-in & Walking campus tour **Data collection:** Participant assent and Photography
(2) Community Walk with guided prompts	(8) Project group work on posters and prototypes	(11) AI Tool Demonstration **Data collection:** Photography

	Data collection: Video recording and field notes	
(3) Group discussion in Circle **Data collection:** Video recording and discussion artifact	(8) Project group work (cont.) **Data collection:** Video recording and field notes	(12) Employee Q&A **Data collection:** Photography
(4) Project group selection **Data collection:** Video recording and field notes	(8) Project group work (cont.) **Data collection:** Video recording and field notes	(13) Project group presentations with professional audience **Data collection:** Video recording
(5) Project group brainstorming **Data collection:** Field notes	(8) Project group work (cont.) **Data collection:** Video recording and field notes	(13) Project group presentations (cont.) **Data collection:** Video recording
Lunch	Lunch	Lunch **Data collection:** Post-survey
(6) Visit Science Dome on college campus to watch culturally-sustaining documentary **Data collection:** Field notes	(9) Discussion on mental health with college Psychologist	(14) Company Museum Tour & Company Store **Data collection:** Video recording for participant interviews, Project posters and prototypes

Session One

The first two sessions took place in a city in Washington state on a local community college campus. The first session began with a community walk, which guided participants to explore the landscape of the local campus (Bang et al., 2013) while contemplating the following prompts: (a) what communities are you a member of, (b) what challenges do you see in these communities, and (c) what aspirations or dreams do you have for your community and yourself. Upon returning, they gathered in a circle for a group brainstorming session (Wenger et al., 2002), facilitated by the use of a talking stick to encourage equitable sharing. During this activity, participants shared insights into the community-centered questions they considered during their walk. Drawing from the collective ideas, participants then self-selected into groups based on the

community themes that resonated most with them, dedicating the remainder of the session to ideating potential technological innovations to address these issues.

Session Two

In the second session, participants collaborated within their groups to create an informational poster and prototype of their proposed technological innovation. These group interactions fostered rich discussions on current and future selves, navigation knowledge, and community.

Session Three

The third session took place at a large global technology company's campus, offering participants an immersive learning experience. Here, they engaged in a tour of the campus, observed a live demonstration of generative artificial intelligence tools, participated in a question and answer panel with employees, presented their proposed technological innovations to an audience of industry professionals, and visited other attractions on campus. As I will detail further in this article, these sessions provided a space for onto-epistemic exploration of future self-concept across individual pathways and community networks.

Communities-centered design

As a design-based research study grounded in social practice theory of learning, the workshop environment was intentionally and deliberately focused on fostering a community of practice amongst all participants and facilitators through engaged activities and materials. Social practice theory of learning is well-suited for this study because it elaborates on how participation in social practices and settings contributes to meaning-making while interpreting interest-related or disciplinary pathways within the context of existing "structures of practice [which] constrain agency and limit access to some settings" (Penuel et al., 2016). While other perspectives may

offer insightful analyses on the study in question, such as cultural-historical activity theory (CHAT), social practice theory supports the primary unit of analysis being persons in practice and identity outcomes as opposed to the activity system itself.

In this study, I define community from the perspective of *kapwa*, a key tenet of *Sikolohiyang Pilipino* or the field of Indigenous Philippine Psychology as defined by Virgilio Enriquez (2004). *Kapwa* refers to the collective identity that connects members of a community, the interwoven relationships that maintain this communal belonging, and the shared commitment to united goals including the decolonization of historically oppressed groups. Maharaj "Raju" Desai uplifts the concept of *kapwa* in learning settings to form Critical Kapwa pedagogy (2016), capturing the importance of building deep connections to support the liberatory work of decolonizing our minds and futures:

> Critical Kapwa is about revolutionizing ideology, epistemology, and spirituality in order to combat the daily manifestations of the residual hegemonic trauma in our lives, families, and communities caused by colonization. It is also about seeing and building connections between people, cultures, places, environments, history, and spirituality. The three pillars—Humanization, On Becoming Diwa(ta), and Decolonizing Epistemologies—intersect with one another to destroy hegemonic ideological structures that perpetuate colonial domination while they also empower the individual to operate outside of those hegemonic ideological structures. (Desai, 2016, p. 37).

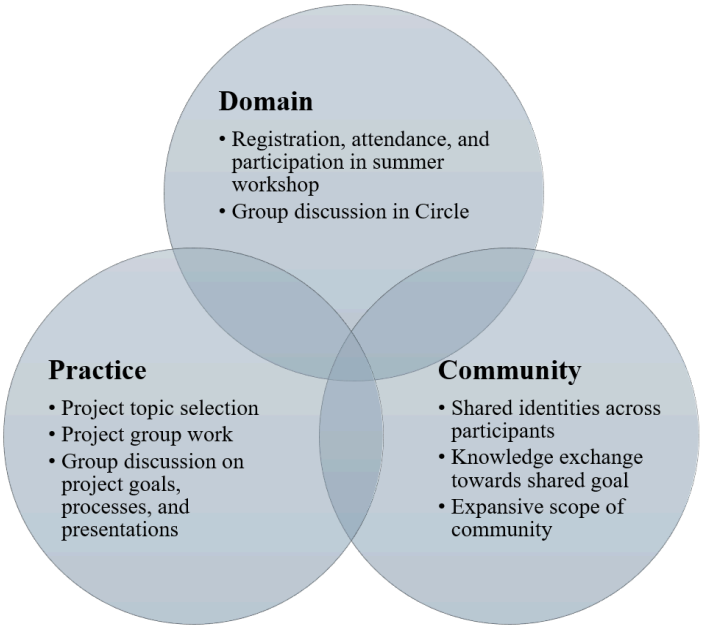
Communities of practice (Lave & Wenger, 1991; Wenger, 1998) is a central focus in the design implementation with intention to foster a supportive learning environment where participants may feel safe to explore current and future self-concepts. Established communities of practice embody three shared core concepts: domain, community, and practice. Within the

workshop design, each element was attended to in order to build a community-centered learning environment. A shared domain of interest and participation began to develop through each participant's commitment to register, attend, and participate in a technology-focused summer workshop. Although the workshop was free to attend, participants did need to take action to register for the offering on the college's website; and even in cases where adolescent participants were required to attend, by their parent or guardian, their decision to participate in the activities was not mandatory or enforced by any facilitators. Each participant's choice to engage in each session and activity expresses agentic behavior establishing commitment to the shared domain. This collective domain is explicitly defined during the group discussion in circle (Activity 3, Table 1) where participants openly shared communal identities, challenges, and aspirations which would form the foundation of the practice they engage in. In this discussion, shared community is initiated through participants acknowledging overlapping identities, school affiliations, geographical neighborhoods, ages, and other commonalities. As participants engaged in project work, their coordinated efforts towards a joint activity in conjunction with reciprocal knowledge exchange solidified a shared community. The visit to the technology company's headquarters (Session 3, Table 1) was intentionally scheduled at the end of the workshop to expand the scope of this established community. Throughout the workshops, participants were positioned as technologists and innovators – after two sessions of reinforcing this community identity, the transition to a professional setting aimed to further stabilize this identity through established access and a sense of belonging within a typically restricted space. One of the material design implementations included providing personalized badges to all participants which mimic the official badges the company's employees wear; these badges act as identity resources which enhance interest development towards a disciplinary identity (Van Horne &

Bell, 2017) and position participants in shared community with the professionals they encounter and space they occupy.

The community's shared practice was grounded in their defined shared domain as participants self-selected their project's focus (Activity 4, Table 1) based upon the group discussion in circle (Activity 3, Table 1). Considering the project groups as subsets of the full participant population, each project group shared an internal practice focused on their self-selected topic, while also engaging in a broader shared practice across all groups to make sense of project goals, the development process, and presentations. The *Hack for the Future* design structure, activities, and materials cultivate participant investment in a community of practice centered around collective learning in a shared domain of human endeavor, particularly expansive possible self identity work.

Figure 1. Communities of practice design implementation



Navigation knowledge

Navigation knowledge informs possible self identity work as it offers guidance on applied practice and realized pathways towards aligning self-concept to possible future selves – an essential process in the nexus of disciplinary identification (Van Horne & Bell, 2017). Instances of navigation knowledge exchange in participant interactions serve as a clear indicator of active possible self identity work. The following transcript, extracted from video recordings of project group work (Activity 8, Table 1), offers an instance of navigational knowledge exchange representative of the corpus:

Transcript 1. FAFSA navigation knowledge

1	**Fern**	I have like a question about this financial aid thing.
2	**Ms. T**	Hit me! ((claps))
3	**Fern**	Like in general what do I need to do because I have no clue so ((chuckles & brushes hair quickly)).
4	**Ms. T**	Sooo if you go to, it's FAFSA F-A-F-S-A.gov G-O-V and it's gonna –
5	**Fern**	I can apply for it online?
6	**Ms. T**	Yes. For you, you want to start so – I will tell you the federal government re-hauled it this year and it has been a diiisaster. And they've had to redo it, it's supposed to make it simpler and actually my friend who finally did it said it's way simpler but I don't know what they did. You have to create an ID. It's called the FAFSA ID, okay. Yeah, so it's called, or people call it F-S-Aid. Um, you can't do this until October 1st.
7	**Fern**	Okay.

As Ms. T offers actionable insight on attaining financial aid, Fern and the other engaged participants may leverage this information to align their current self-concept with a

college-educated possible self identity. From this perspective, episodes of navigation knowledge enacted towards a possible self identity are centered as the unit of analysis for the data corpus.

Researcher Positionality and Community membership

The nature of community-centered learning design and critical *kapwa* pedagogy demand a deep commitment to interpersonal relationships initiated within the environment and extending to the world beyond (Desai, 2016). To ensure I could sustain this commitment, I intentionally prioritized working within my own community. I was raised in the geographic region serving as the research setting for the majority of my childhood and adolescence. As a second-generation Filipina-American, my maternal family immigrated to this region in the 1970s – a common migration pattern for many Filipino families who were suffering under Ferdinand Marcos' declaration of martial law and overarching dictatorial regime. Growing up in this area afforded me many beautiful experiences, prominently exposure to deeply interwoven community networks of support – and naturally, there were challenging aspects as well. Throughout my public school education, I had no in-school opportunities or resources to pursue a STEM-focused curriculum beyond state-required science and math classes; nor any accessible after-school opportunities. Although the area is only 45 miles south of Seattle – one of the world's largest tech cities – the presence of tech education, disciplinary resources, and job market is lacking. Through my current connections to local educators from schools I attended and the surrounding area, I have learned the progress to support this subject in curriculum is steady but not sufficient. All of the participants present in this study are actively attending the public schools I am referencing in this reflection; many attend my own alma mater, and we quickly bonded over shared teachers and experiences. In a geographical context, the community college campus is one block up the hill from the high school I attended and it has consistently served as an

accessible educational institute and resource for the local community. While I was in high school, the college offered free classes to students for college credit through a Running Start program. I began my working relationship with their ASPIRE program in 2022 when I co-designed my first summer workshop with their team. This first successful implementation sparked a strong relationship and recurring collaboration to bring technology education to local youth through annual summer camps, speaking panels, and extracurricular opportunities. The implementation of *Hack for the Future* was the third co-design process I have worked through with the ASPIRE team. These summer programs serve as a helpful, accessible resource and safe space for youth to engage in while school is out of session – for this reason, many of these participants have been present in past summer workshops and I have known many of them for a few years now. In this study, I take up the roles of community member, facilitator, observer, researcher, and industry professional. My personal commitment to community drives my desire to share the useful skills I have acquired along my individual journey towards a technologist identity with the community that formed me – further informing the understanding of *kapwa* as a cyclical relationship of growing self-concept in relation with growing community identity. I am within my community, and my community is within me – inextricably connected through culture, history, land, experience, and identity.

Although I am well-situated within my community, there are multiple identities I hold which position me as an "outsider" within the group – I consider these to include researcher, university student, and technology professional. Attending to the importance of fostering a community-centered environment, I intentionally connected these "outsider" identities to experiences relatable to participant's worldview and fostered open dialogue to address any questions. The U.S. Census Bureau reported that 22.6% of the city's population has attained a

bachelor's degree or higher, 87.1% attained a high school degree or higher (2020). I recall my own understanding of graduate school being shrouded in mystery when I was younger, as I assumed advanced learning environment practices could not have any relation to my current classroom experience. I kept this in mind as I addressed my roles of researcher and university student while informing the participants of the study and confirming their assent (Activity 1, Table 1). I shared that I am a student, just like them, and I would be writing a paper about what we do together in this workshop much like the writing practice they have been tasked with in school – connecting a potentially unfamiliar identity to a familiar, mutual experience.

My personal commitment to liberatory education (hooks, 1994) is another key element I bring to the design-based research methodology. This implementation is designed to attend to the whole participant and their lived experiences – going beyond learning and towards holistic well-being and capacity for freedom dreaming (Kelley, 2002). Every participant attended the workshop for free – and transportation support was provided, to and from the workshop, as needed. During each session, there was dedicated time for meals, leisure, and being outdoors. We provided various nutritious food options, and snacks available throughout the day. Participants were not required or coerced to engage in every activity, and they would not face any consequence for opting out. While a significant portion of the workshop agenda focused on technology disciplinary work, activities were included to specifically deepen participation in culture (Activity 6, Table 1), as well as mental health and well-being (Activity 9, Table 1). Community is a central component in education as a practice of freedom (hooks, 1994) and critical *kapwa* pedagogy (Desai, 2016) – it serves as my personal north star, and a guiding light for this study.

Research Setting and Participants

The primary research setting is a community college campus in the Pacific Northwest. A uniquely diverse community – it is one of the few cities in Washington with a majority minority population (U.S. Census Bureau, 2020). The culture of this region is an amalgamation of contributions from a multitude of ethnic backgrounds; prominently communities from Pasifika, Filipino, African, Latino, Asian, and Indigenous heritages. The college campus is located on the ancestral lands of the Puyallup Tribe of Indians, the Nisqually Indian Tribe and Steilacoom Tribe. The buildings sit on a sprawling landscape across rolling hills, connected through many beautiful walking paths – some of which lead to a lake and park, both are popular places for local youth to spend time together. This familiar, local setting served as a common ground, community space for all of the participants – connecting this learning environment to their personal lived experience.

The secondary research setting is the global technology company's headquarters located about 60 miles north of the community college campus. The technology campus is located on the ancestral lands of the Sammamish, Duwamish, Snoqualmie, Suquamish, Muckleshoot, Snohomish, Tulalip, and other coastal Salish people since time immemorial. During the third session, participants explored parts of the West and East campus. This change in scenery offered participants access to a typically restricted professional space where they could explore a possible self-identity and generate a novel, communal experience in a new place—one that none of the participants had experienced before.

The participants engaged in *Hack for the Future* are middle and high school students from public schools in the local area. The ASPIRE program began marketing the free summer workshops to local public schools during spring, allowing ample time for registration. The only

requirement for participation in the workshop was parent/guardian approval. The facilitators of the workshop, outside of myself, are all employees of the college or interns working directly for the ASPIRE program. Through their ASPIRE work and community membership, many of the facilitators had established relationships with participants prior to the beginning of the workshop. They are established community members who live in the same region, have attended similar schools as the participants, and some have children in the same school districts. Ms. X and Mahina know each other's families and are both members of an after-school cultural program, Tautua Pasifika Club, at Mahina's high school. Mr. M's work responsibilities have brought him into local middle and high schools where he has connected with some of the participants before – and many other facilitators have known some participants through past workshops and events. All of the participants and facilitators combined form the community of practice established in this study (Table 2).

Table 2. Participant and Facilitator details

Name	**Cultural identity**	**Pronouns**	**Middle or High school student**	**Session attendance (✓ = Present for all sessions)**
Fern	Filipino	they/them	High school	Missed Session 1
Aiden	White	he/him	High school	✓
Anya	White	she/her	High school	Missed Session 1
Grant	Filipino	he/him	High school	✓
Cameron	White	he/him	High school	✓
Noah	Korean	he/him	High school	Missed Sessions 2 & 3
Trentyn	Black	he/him	Middle school	✓
Zeke	Pasifika	he/him	High school	✓
Nala	Black	she/her	High school	Missed Session 1
Adrianna	Latina	she/her	High school	✓

Mahina	Pasifika	she/her	High school	✓
Lorenzo	Black/Latino	he/him	Middle school	✓
Elijah	Black/Filipino	he/him	High school	✓
Maria	Latina	she/her	High school	✓
Nani	Pasifika	she/her	High school	Missed Sessions 2 & 3
Mr. M	Black/Pasifika	he/him	Facilitator	✓
Ms. T	Latina	she/her	Facilitator	✓
Ms. X	Pasifika	she/her	Facilitator	✓
Ms. S	German	she/her	Facilitator	✓
Ms. C	Black	she/her	Facilitator	✓
Ms. P	Thai	she/her	Facilitator	✓
Ms. E	Filipino	she/her	Facilitator	✓

Data collection

Data for this study was collected from a single implementation of *Hack for the Future* during the summer of 2024; due to time constraints, only one iteration was accomplished and given the opportunity, I would readily implement another.

Multiple data types were collected throughout the duration of the workshop, including pre- and post-surveys, video recordings, collective discussion notes, field notes, photos, video recorded interviews, and project artifacts. The video recordings constitute a significant portion of the data corpus, with over 10 hours of video footage documenting activities during the first and second sessions, group presentations and participant interviews from the third session (Table 1).

Analytical approach

For data analysis, it was essential to concentrate on data types which would enable observation of possible self identity work and enactments of communities of practice within the

learning environment, both of which are heavily reliant on observing exchanges between participants – leading to the prioritization of video recordings for interaction analysis. Field notes and artifacts serve as secondary data to enhance and solidify meaning derived from the interaction analysis. Surveys were included in data collection to measure participant's interest in the discipline of technology before and after the workshop; and although they will not be utilized in this study, it may be interesting to revisit this data with a research question aligned to developing a disciplinary identity in technology within the context of community-centered learning design.

Episodes of navigation knowledge (Van Horne & Bell, 2017) enacted towards a possible self identity (Markus & Nurius, 1986) are the primary unit of analysis. To identify these episodes, I utilized video software to generate closed caption transcripts for over 10 hours of recordings, which I manually revised for accuracy. I reviewed recordings to identify episodes of future self-concept ideation and shared guidance for realizing a referenced possible self. I created content logs for those interactions and identified a coding scheme for meaningful dimensions of community which support possible self identification. The coding scheme went through multiple iterations as I reviewed recordings independently and with input from research groups; the final coding scheme is detailed in Table 4. I utilized interaction analysis (Jordan & Henderson, 1995) on each episode to establish my own understanding of the data. Then, the episodes were shared with two different university research groups for collective interaction analysis to validate, challenge, and expand upon my initial analysis – and narrow selection to the transcripts provided in these findings.

The specific dimensions of community identified include exchanges connected to shared experience, empathy and care for others, current identities, possible self identities, and community support (Table 3).

Table 3. Example of coding references for data analysis.

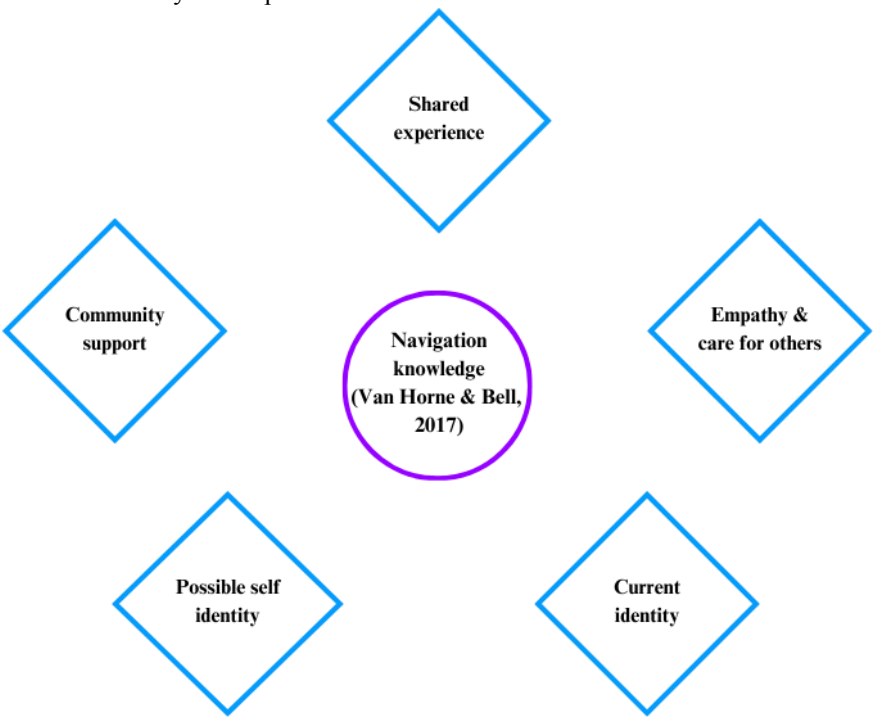
Dimensions of community supporting possible self identification	Representation in data
Shared experience (Wenger, 1998)	"I remember when I took the SAT and it was just like –"
Empathy & care for others (Lave & Wenger, 1991; Wenger, 1998)	"A dream I have for the community is that we can go out into the–just go outside and not be afraid that something's gonna happen to us because who we are or the body we were born into."
Current identity (Lave & Wenger, 1991; Wenger, 1998; Van Horne & Bell, 2017)	"Is it a requirement for you guys to take SATs? At your [high school]?"
Possible self identity (Van Horne & Bell, 2017)	"Yeah, [taking the SAT is] not a requirement but like for competitive colleges, you do."
Community support (Wenger, 1998; Bricker & Bell, 2012)	"Always push your boundaries. I think this is a great idea."

FINDINGS

I present multiple interactions which illustrate how community-centered learning design elicits dimensions of community which support possible self identification. These interactions link navigational knowledge (Van Horne & Bell, 2017) to recurring, supporting dimensions of community (Table 4) to form a matrix of possible self identification.

Across the range of analyses, I will anchor navigational knowledge as a central component in the matrix of possible self identification upon which meaningful connections to and clusters of community embodiment will be drawn.

Figure 2. Navigational knowledge and dimensions of community embodiment to attend to in analysis of interrelation to possible self identity development.



To inform the research questions guiding this study, two project groups are prominently featured in this analysis: the Trashinator and OASIS groups. Details about their self-selected community challenge, technological solution, and poster and prototype artifacts provide context for understanding how participants' interactions with the design of the learning environment add layered meaning to the transcripts.

Trashinator group

The Trashinator group comprised four participants: Fern, Aiden, Grant, and Anya. Anya was not present for the first session of the workshop and joined the group halfway through the second session when Fern introduced her to Aiden and Grant. Throughout their group discussions, it was identified that all participants attend the same public high school; however, only Anya and Fern were known to each other prior to this workshop. Grant and Aiden are in 10th grade, while Anya and Fern are in 12th grade. Anya recently shifted to online schooling to

complete her final year of high school while Fern, Grant, and Aiden continue to attend in-person. All of the group members identify as members of historically marginalized communities and/or low-income socioeconomic status.

Their group name, Trashinator, is inspired by their technological innovation project: an autonomous robot designed to collect trash and litter from both land and water environments (Figure 3). Their solution aims to combat pollution and contribute to environmental cleanup efforts for the health and betterment of the community (Figure 4).

Figure 3. Trashinator prototype for land rover model developed by participant group.

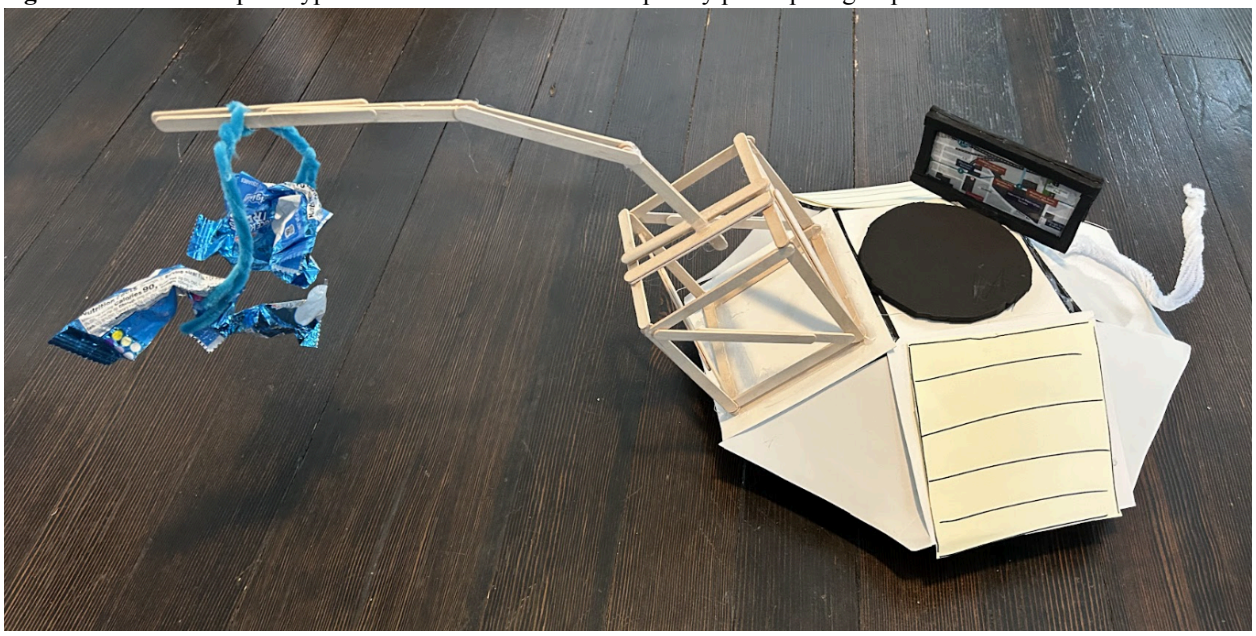
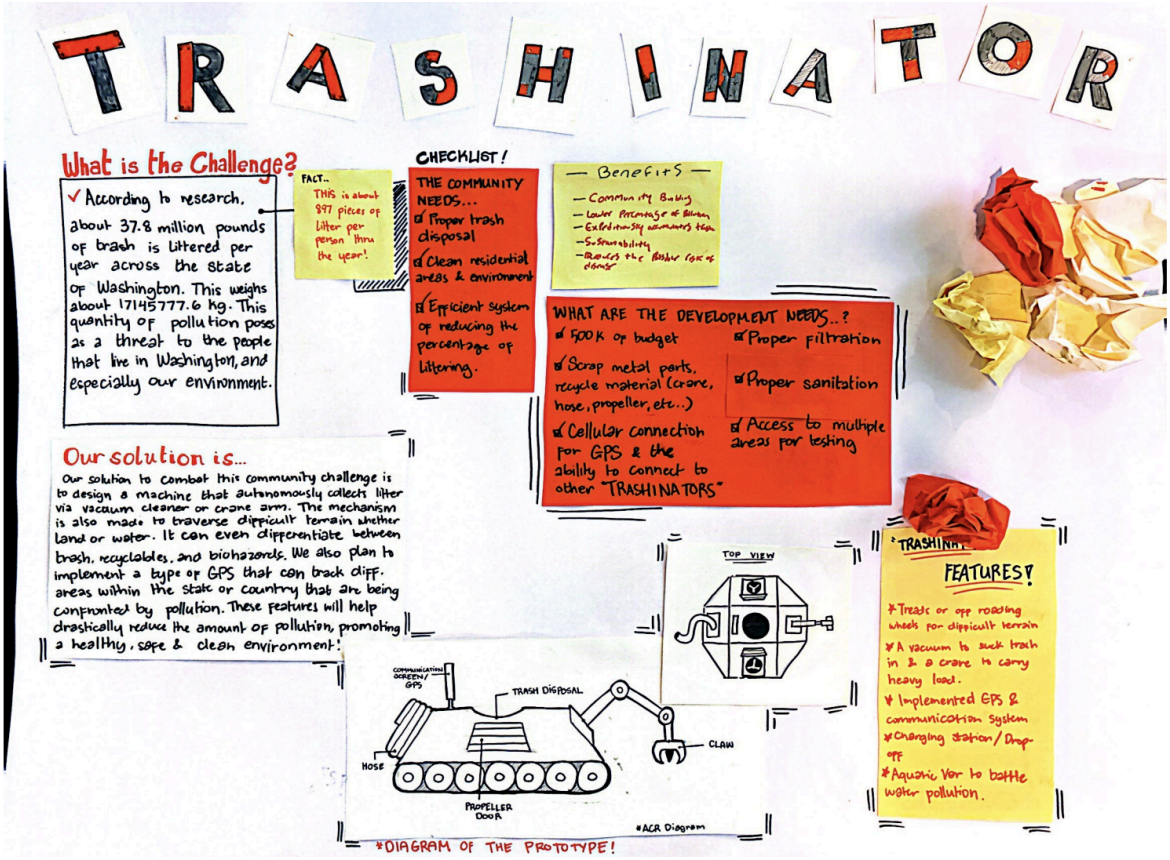


Figure 4. Poster developed by the Trashinator group to explain their technological solution and how it contributes to healthier environments for the community.



OASIS group

The OASIS group is uniquely composed of one participant, Cameron, and one workshop facilitator, Ms. S, who is a college student and ASPIRE intern. Although this group configuration is unlike the other project groups, the group's interactions are theoretically rich expressions of communities of practice (Wenger, 1998) guiding learning and socially consequential examples of the learning environment design influencing participant learning. Participants were encouraged to self-select a project in alignment with their community identities and aspirations regardless of participant distribution across groups. Cameron, a 10th grade student, frequently championed the need for protection for LGBTQIA+ communities and abuse survivors throughout the workshop and prioritized these matters in the selection of their project – even when they were the only

participant interested in pursuing the topic. Ms. S, who had developed a relationship with Cameron through previous ASPIRE workshops, stepped in to support Cameron's project. The pair developed an application called OASIS (Figure 5), an acronym for Ongoing Abuse Support in Society, to offer resources centered on the health and well-being of individuals actively suffering from various types of abuse in efforts to provide options for safely leaving harmful, dangerous situations (Figure 6).

Figure 5. Application interface prototype developed by group.

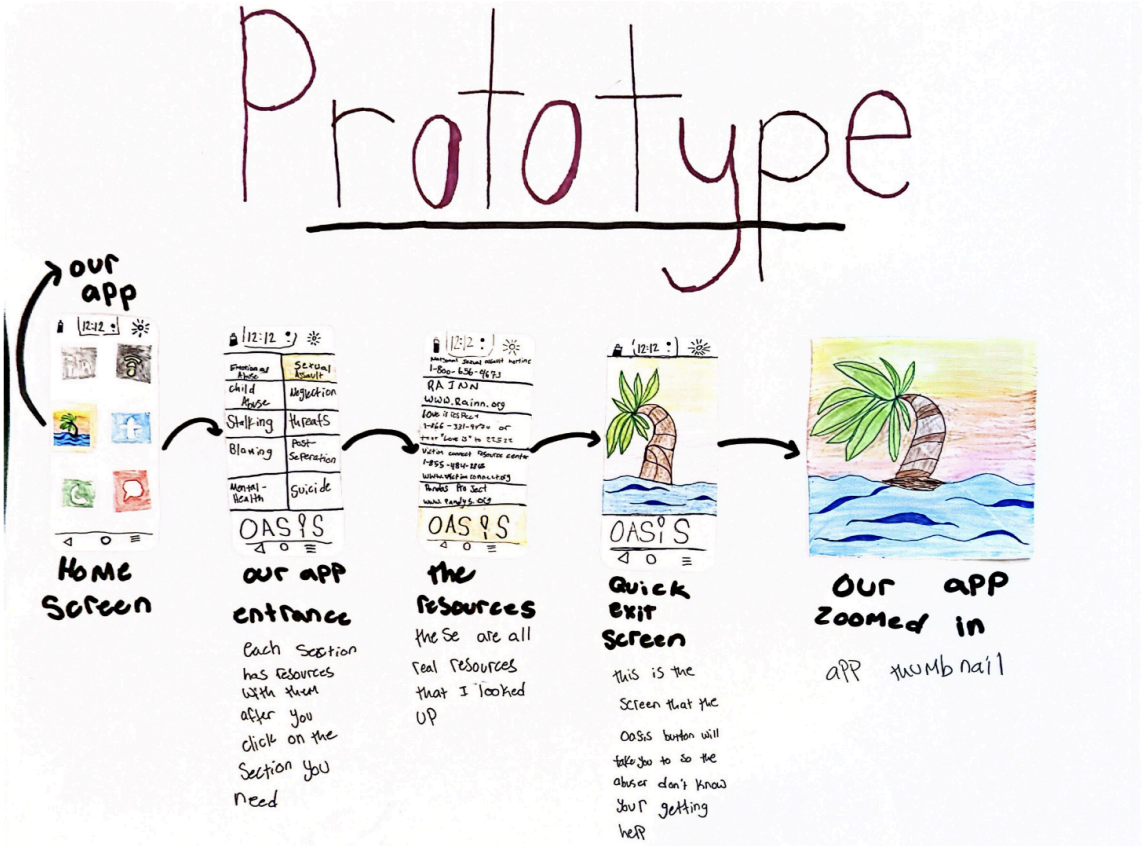
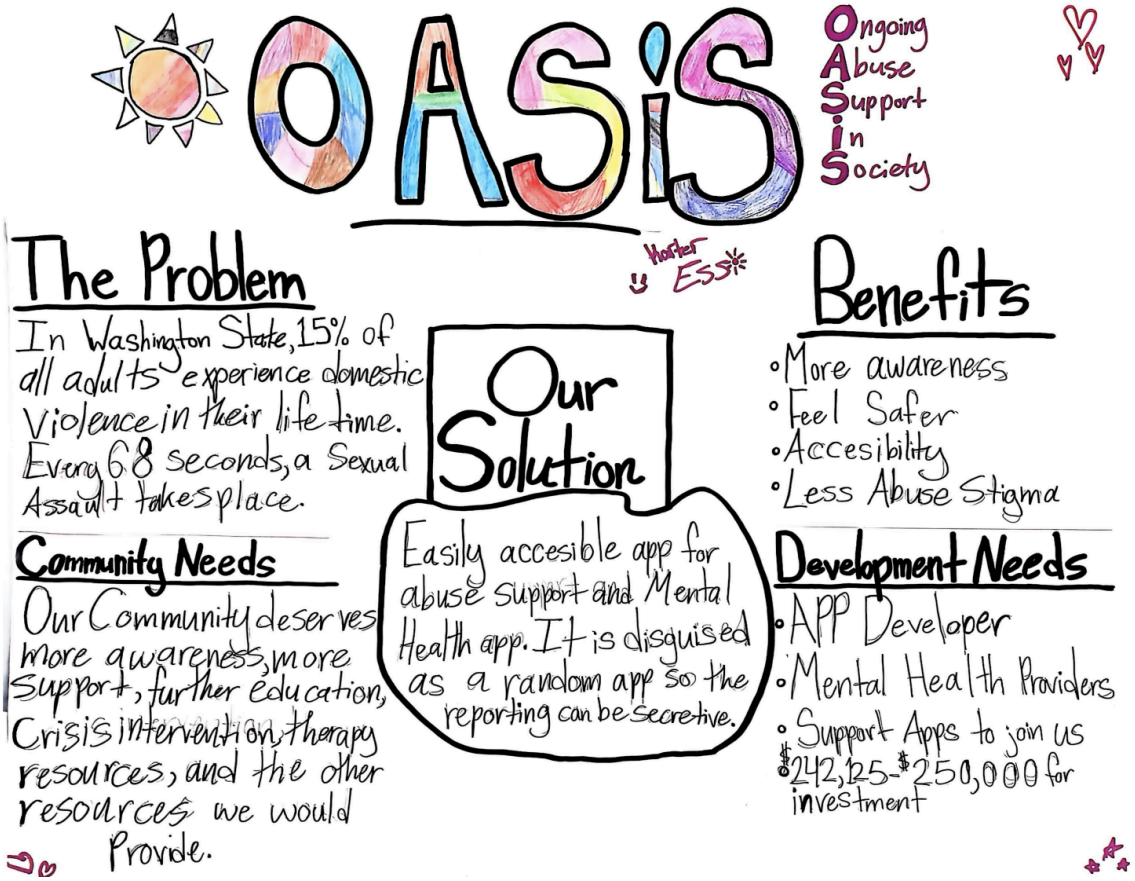


Figure 6. Poster developed by the OASIS group to explain how the application offers support and resources to victims of ongoing abuse.



Shared experience

Shared experience is classified as a collective practice within the core concepts of communities of practice (Wenger, 1998). While actively engaged in a shared experience within the learning environment, participant interactions reflected on collective experiences beyond the workshop setting. The following interactions serve as representations of shared experience acting concurrently with navigation knowledge to support possible self identification.

Transcripts 2 and 3A are separate segments of a larger Trashinator group interaction which occurs during the second session while the group develops their project poster and prototype (Activity 8, Table 1).

Transcript 2. Trashinator group discusses project development experience.

2.1	**Aiden**	Ignore those mistakes ((gestures to pile of discarded materials)).
2.2	**Anya**	What? ((raises her head in Aiden's direction))
2.3	**Aiden**	Most of those triangles were mistakes.
2.4	**Mr. M**	See – Just know that everybody only sees this ((gestures towards semi-complete prototype)). But nobody sees the hours ((gestures towards discarded materials)) of countless cutting ((lifts and lowers hands to emphasize strain)) and mistakes ((repeats hand motion, Aiden laughs and nods his head))– and sweat ((repeats hand motion)) – and blood.
		((Fern, Anya, and Grant raise their heads from focusing on their work and position themselves towards the conversation))
2.5	**Fern**	And tears!
2.6	**Mr. M**	And tears, right?!
		((Everyone laughs))

In Transcript 2, Mr. M reframes mistakes in the context of project development by connecting the current project work to the broader life experience of how the hard work required to achieve a goal often remains unseen and unacknowledged (Turn 2.4). This addresses Aiden's acknowledgment of the challenges they are currently experiencing (Turn 2.1), affirms that difficulties are a natural part of the process, and reassures them that they are still on track toward the collective goal. The collaborative effort to make sense of the need for perseverance while working towards a goal provides the space to consider what it means to embody a self-concept of perseverance in the face of challenge. The participants engage with this collective identity work as they shift their attention to the conversation, empathize, and affirm the experience (Turn 2.5), and express joy for the collective journey. Even when centered in adversity, a sense of shared understanding makes space for laughter, establishes systems of support, and builds a sense of social rapport in the design culture. The interaction continues on and eventually segues into a

discussion on the Scholastic Aptitude Test (SAT), a standardized test commonly required for college admissions (Transcript 3A).

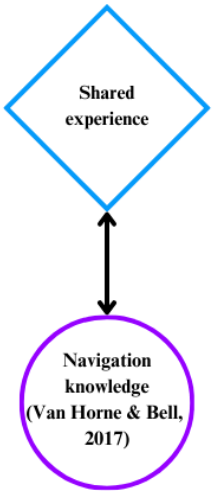
Transcript 3A. Trashinator group discusses SAT experience.

3.1	**Anya**	And the English grammar [section] is so insane.
3.2	**Mr. M**	((speaking excitedly towards Anya)) It is! I remember when I took the SAT and it was just like –
3.3	**Fern**	((quietly)) I was –
3.4	**Mr. M**	Showing me four sentences that are literally the same, it was like 'pick the best one!' and I was like –
3.5	**Fern**	Um…
3.6	**Mr. M**	This is a biased thing! Like who's gonna choose who's the best one? I feel like they all make sense.
3.7	**Ms. E**	((nodding head in agreement and looking at Mr. M)) SAT's the worst.
		((Anya, Mr. M & Ms. E laugh))

The group commiserates on the shared experience of taking the SAT for college applications and acknowledges the perceived subjectivity of the language and grammar test questions. For additional context, it is important to note that Fern, Mr. M, and Ms. E share a common experience of being raised in bilingual households. Fern, who had not yet taken the SAT at the time of this interaction, is gaining insight on the process through their community's experiences. Discussing the subjectivity of what is supposed to be an objective test (Turn 3.6) provides navigation knowledge on the mental and emotional journey towards enacting a college-educated possible self as a bilingual individual. As in Transcript 2, the group finds laughter in their shared challenge and implicitly recognizes that the problem lies within the process, not in their individual identities. Shared experiences connect with navigation knowledge to assure individuals of their ability to accomplish future goals and possible selves – establishing

a posture of levity and communal understanding in adversity and protecting from the spirit-murdering that takes place when individual students are forced to bear the onus of oppressive systems designed to stifle advancement (Love, 2019).

Figure 7. Matrix of Possible self identification includes a connection between Shared experience and Navigation knowledge.



Empathy & care for others

Empathy and care for others are not explicitly discussed as a necessary component of the Communities of Practice framework (Lave & Wenger, 1991; Wenger, 1998). This study argues that shared meaning and practice is best actualized when emotional engagement and attentive care is present in the learning environment. The following interaction (Transcript 3B) is a continuation of Transcript 3A, which illustrates an instance of attention to emotional needs supporting possible self identification.

Transcript 3B. Continuation of Trashinator group discussing SAT experience.

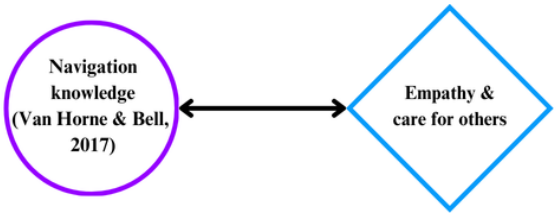
3.8	**Fern**	Now, I'm scared! I want to take them like… next year.
		((laughing stops))
3.9	**Mr. M**	((shifts attention to Fern and speaks calmly)) But it's good though –
3.10	**Ms. E**	((attention directed to Fern)) Don't you technically not have to [take it]?
3.11	**Mr. M**	((to Ms. E)) Yeah, but like for competitive colleges, you do.

3.12	**Fern**	Well, uh – well, my mom will force me to take it.
3.13	**Ms. E**	Of course she will.
		((Fern and Ms. E laugh))
3.14	**Anya**	((speaking calmly to Fern)) It's not like… as long as you study –
3.15	**Ms. E**	((to Fern)) Uh, ACT's a little better.
3.16	**Fern**	((to Ms. E)) Okay.
3.17	**Anya**	Like a lot of the information is okay. Like I've went through some of the practice tests and it's okay.
3.18	**Mr. M**	Mhm.
3.19	**Anya**	But it's just really convoluted.
3.20	**Mr. M**	Yeah.
3.21	**Anya**	So you need to study.
3.22	**Mr. M**	((nods head)) Yeah.

Fern openly expresses fear at the thought of taking the SAT (Turn 3.8) and the group's tone shifts from one of making light of the challenge (Turns 3.1, 3.4, 3.6, and 3.7) to attending to the emotional needs of their fellow community member (Turns 3.9, 3.14-3.22). This exchange aims to prepare the community for the necessary step of taking the SAT to reach a college-educated possible self and when Fern vocalizes their trepidation of this milestone, the collective acts to assure Fern of their ability to overcome with the proper preparation (Turns 3.14-3.22). As with life processes in general, emotion plays a key role in educational progress and development of aspirational self-concepts. This study emphasizes the need to care for the whole individual, including their wide spectrum of emotions, if we want to design learning environments that empower participants to overcome the mental and emotional barriers which deter them from pursuing their goals.

Other instances of empathy and care for others are exhibited within the project poster artifacts – highlighting how participants considered the safety, well-being, and health of other human and non-human beings as integral to the well-being of the larger community (Figures 4 and 6).

Figure 8. Matrix of Possible self identification includes a connection between Empathy and care for others and Navigation knowledge.



Current identity

Connecting identity to learning is an important component of both communities of practice and disciplinary identification – although they take different approaches to identity work within learning. Communities of practice positions identity as developing within the context of becoming a member of a community (Lave & Wenger, 1991; Wenger, 1998). Van Horne and Bell predicate that participants leverage their pre-existing identities to make sense of the content and build new disciplinary identities (Van Horne & Bell, 2017). This study combines these approaches to examine how participants draw on their current identities—and their understanding of them—within the learning environment, and how they expand upon these identities based on their context within the community.

In a subsequent exchange, Ms. T shares information about applying for financial aid with Fern. Fern conveys how meaningful this new information is and how it relates to their identity.

Transcript 4. Trashinator group discussion on financial aid.

4.1	**Fern**	Thank you for telling me about the financial aid.
4.2	**Ms.T**	All good.

4.3	**Fern**	Because I don't think that's a thing in the Philippines so it's like something I'm not really worried about but now I am.

After Ms. T shares navigation knowledge about the application process for college financial aid, Fern reflects on how their background and current identity has impacted their awareness of the U.S. higher education system (Turn 4.3). Fern's acknowledgment calls attention to their personal history as it relates to their identity, educational experiences, and advancement; and how these impact the accessibility of this type of information. Community-centered learning design creates space for important conversations on vulnerable topics, such as financial aid and literacy, which may be particularly beneficial to people of shared community identities. According to the U.S. Census Bureau (2020), 15.3% of the city's population were born outside of the United States. Many immigrants, children of immigrants, and first-generation college students face similar situations as Fern when it comes to navigating the implicit aspects of accessing higher education in America. Community-centered learning environments are well-equipped, safe spaces to provide explicit navigation knowledge on these sensitive matters and address specific needs related to identity – contributing to the stabilization of possible self identification. We see this in action in this exchange – Fern is developing their identity, or "becoming", within the context of the community (Lave & Wenger, 1991; Wenger, 1998) as they move towards a possible college-educated self — while concurrently connecting the knowledge they are gaining back to existing identities (Van Horne & Bell, 2017) beyond the workshop (e.g. their Filipino heritage).

Transcript 5 is an excerpt from Mahina's post-workshop interview. Throughout the workshop, Mahina made multiple direct references to her Samoan heritage and community

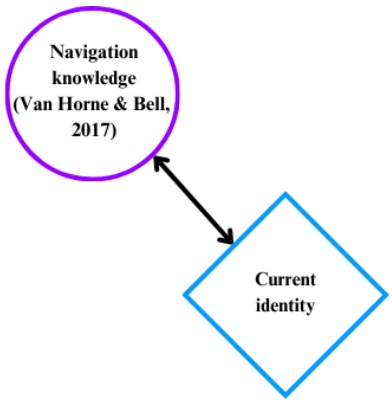
membership. While discussing her community membership in an after-school cultural club, she described her aspirations for the Tautua Pasifika community "to have the ability to be comfortable with one another like how family interacts with one another" (Activity 3, Table 1). During the AI tool demonstration (Activity 11, Table 1), participants were shown how industry professionals use generative AI models to translate written communications to other languages in order to offer customer support to users from around the world. Participants were asked if they wanted the message translated to any specific language and Mahina requested Samoan – the tool did not have Samoan as an option. The demonstrators expressed their apologies to Mahina and told her they would relay the request for Samoan language translation to the tool's development team. The following transcript takes place a couple hours after the tool demonstration (Activity 14, Table 1).

Transcript 5. Excerpt of Mahina's interview

5.1	**Ms. E**	Yeah, absolutely. Did you enjoy the [technology] campus tour?
5.2	**Mahina**	((shakes head yes)) Mhm, yeah.
5.3	**Ms. E**	Yeah?
5.4	**Mahina**	And I liked the Copilot thing ((gestures with hands)).
5.5	**Ms. E**	Yeah, you did!?
5.6	**Mahina**	Yeah!
5.7	**Ms. E**	That's awesome, I'm glad.
5.8	**Mahina**	But the only thing that was–you know–the languages ((giggles)). Our language was like ((shrugs)).
5.9	**Ms. E**	Disappointing, right? Especially when you think about like how many people speak Samoan and yeah, absolutely. Really disappointing.
5.10	**Mahina**	But it was fun!

Community-centered design fosters learning environments where current identity is a core component of meaning-making – both in the sense it acts as an anchor from which participants make sense of the work and an opportunity to expand upon existing identities. Mahina drew on her existing identity to make sense of the project work, likening community care to caring for family; then, expanded this identity by embodying an advocate role when she vocalized the need for Samoan language translation.

Figure 9. Matrix of Possible self identification includes a connection between Current identity and Navigation knowledge.



Possible self identity

Explicit instances of possible self identity work are recognized by multiple participants across the workshop sessions. These direct references to aspirational self-concepts displays demonstrable proof of participants leveraging navigation knowledge to align self-concept to possible future selves (Van Horne & Bell, 2017). I argue that community-centered learning design within established communities of practice supports participant vulnerability and open discussion of aspirational self-concept because the instances of explicit possible self identification occured in the second and third sessions – after scaffolding activities fostered a communal identity engaged in future concept ideation.

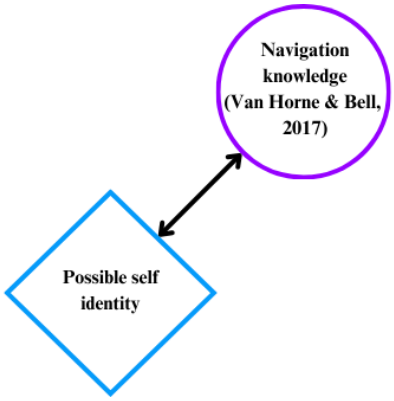
Following the FAFSA navigation knowledge exchange (Transcript 1) in the second session (Activity 8, Table 1), Fern expresses gratitude to Ms. T for sharing this guidance and explains how their current identity has influenced their knowledge of the financial aid process (Transcript 4). Fern goes on to verbalize their aspirations of a college-educated self; specifically, a possible self who can traverse higher education with confidence and ease (Transcript 6).

Transcript 6. Aspirations of a smooth transition to a college-educated self

6.1	**Fern**	I just want my college ((gestures with thumb and index finger pinched together)) my college years ((hand gestures again for emphasis)) to be smooth sailing ((smoothing motions with hands)).
6.2	**Ms.T**	You can get money, if you're on time there's money. It's just hard when you're not and you're scrambling.
6.3	**Fern**	Mhmm. ((nods head yes))

Throughout the scaffolded interaction (Transcript 1, Transcript 4, & Transcript 6), Fern considers what can be actioned upon today to achieve a college-educated self in the future, applies this navigation knowledge within the context of their current identity, and then vocalizes this aspirational self-concept. This explicit reference to a possible self identity (Turn 6.1) is a result of sequential advancement of meaning-making in a community-centered environment leveraging navigation knowledge to situate current identity in connection with possible self identity (Van Horne & Bell, 2017) and evidences the stabilization of this future self-concept.

Figure 10. Matrix of Possible self identification includes a connection between Possible self identity and Navigation knowledge.



Community support

Wenger acknowledges that emotional connection and encouragement among participants contribute to identity and participation evolution; and social recognition as a full-participant by others in the community is a powerful form of encouragement which affirms one's identity within the community (Bricker & Bell, 2012). This can be especially meaningful for newcomers or peripheral participants who are moving towards full participation (Wenger, 1998). Within this study, this concept is referenced as community support.

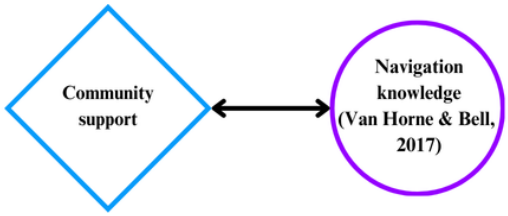
Anya was not present in the first session of the workshop and she arrived a few hours into the second session (Activity 8, Table 1). Transcript 7 takes place approximately 10 minutes after Anya joined the project group.

Transcript 7. Community support for future self

7.1	**Mr. M**	Let me know if you ever do come [to this college], I got you.
7.2	**Anya**	I might.
7.3	**Mr. M**	I'll make sure you're taken care of. ((Anya and Fern laugh)) I know people that are good people.

As a newcomer, Anya had not experienced key activities in the first session designed to establish a community of practice amongst participants. Mr. M quickly brings Anya into the fold by offering community support for her possible self – one who chooses to attend college. This extension of community connections to future self-concept reinforces a positive association and feasibility of achieving this aspirational identity with support from the community.

Figure 11. Matrix of Possible self identification includes a connection between Community support and Navigation knowledge.



Cooperating community dimensions supporting possible self identification

Having established interconnections among dimensions of community that support navigation knowledge, we now turn to an instance in which multiple dimensions converge, revealing a powerful episode of navigation knowledge enacted toward a possible self identity. In Transcript 8, workshop facilitators discuss planning and logistics for project presentations within earshot of the majority of participants (Activity 8, Table 1).

Figure 12. Physical layout of Presentation decision (Transcript 8). Participant order from left to right: Ms. S (bottom left), Cameron (legs crossed in frame), Mr. M (in yellow swivel chair), Ms. X (in purple shirt behind Mr. M), and Ms. E (out of frame right). Other participants spread throughout the Makerspace.

Transcript 8. Presentation decision

Timestamp: 00:26:33.00		
8.1	**Mr. M**	((to Ms. E)) Are we presenting these today?
8.2	**Ms. E**	No, so they're–
8.3	**Ms. X**	We're presenting them tomorrow ((in high-pitched, scared tone)).
		((Mr. M's opens mouth in shock))
8.4	**Ms. E**	They're bringing them tomorrow–yes.
8.5	**Mix of Participants**	No–Oh no!
8.6	**Ms. E**	We're going to do some kind of like fair, Science Fair option where they'll have their posters and their prototypes spread out around the room and then all of the [industry professionals] will come through, get to see it, ask them questions. I did offer that if they want to present it formally, they have that opportunity. I think I have one group that might be interested in it…
8.7	**Mr. M**	Yeah, that's dope.
8.8	**Ms. E**	So, if so, we'll give 'em the chance to like get up in front of the group.
8.9	**Mr. M**	That's cool.
8.10	**Cameron**	Well, wait wait wait I ahh ((mumbling sounds))...
		((Mr. M and Ms. S orient their bodies and gaze towards Cameron))

8.11	**Ms. S**	Do you want to?
8.12	**Mr. M**	That's dope, that's cool.
8.13	**Cameron**	I want to but I don't.
8.14	**Ms. E**	You should, Cameron–you should.
8.15	**Mr. M**	Oh, present!? You should present!
8.16	**Ms. S**	I think this is really important.
8.17	**Ms. E**	You really should.
8.18	**Mr. M**	((Hand reaches out to Cameron)) Up to you though! Like your comfortability–
8.19	**Ms. E**	Yeah, absolutely!
8.20	**Mr. M**	–but we're always going to encourage you to push your boundaries.
8.21	**Ms. S**	((in agreement)) Mhm…
8.22	**Mr. M**	Always push your boundaries. I think this is a great idea.
8.23	**Ms. E**	You could have one of us up there with you to just like help guide through but I–it is a really, really good idea.
8.24	**Ms. S**	I think this would be great.
8.25	**Ms. E**	And very much needed.
8.26	**Ms. S**	Especially because we need an app developer and I'm sure [the tech company] has plenty of them.
8.27	**Cameron**	I'll think about it over lunch.
8.28	**Mr. M**	Ok ((nods))
Timestamp: 00:27:42.00		

By the time of project group presentations during the third session (Activity 13, Table 1), all participants decided to formally present their posters and prototypes to the audience of industry professionals. Every participant had the opportunity to introduce themselves and group members took turns sharing information on their proposed technological solution. It is important

to note that no formal requirements were imposed for the presentations beyond a suggested sequence of content (Table 4), including no obligation for all group members to speak – however, each member did speak. Consequently, each participant exercised agency in deciding to engage in the public speaking opportunity – this agentic move is an embodiment of the care embedded in the learning environment design which prioritized bringing the participants into spaces of new action in a supportive and elective manner. This exchange and resulting decision of each participant, between Activity 8 and Activity 13, evidences the move from peripheral participation to full participation (Lave & Wenger, 1991; Wenger, 1998).

Table 4. Guidance provided to participants on sequence of content for group presentations

Recommended sequence of content for project group presentations
1. Introductions (including names of project group members and name of the technological solution) 2. What is the challenge the community is experiencing? 3. What are the community needs which must be addressed? 4. What is the proposed technological solution? 5. What are the benefits of the solution and how does it meet community needs? 6. What are the development needs to bring this to life? 7. Explain the prototype and features.

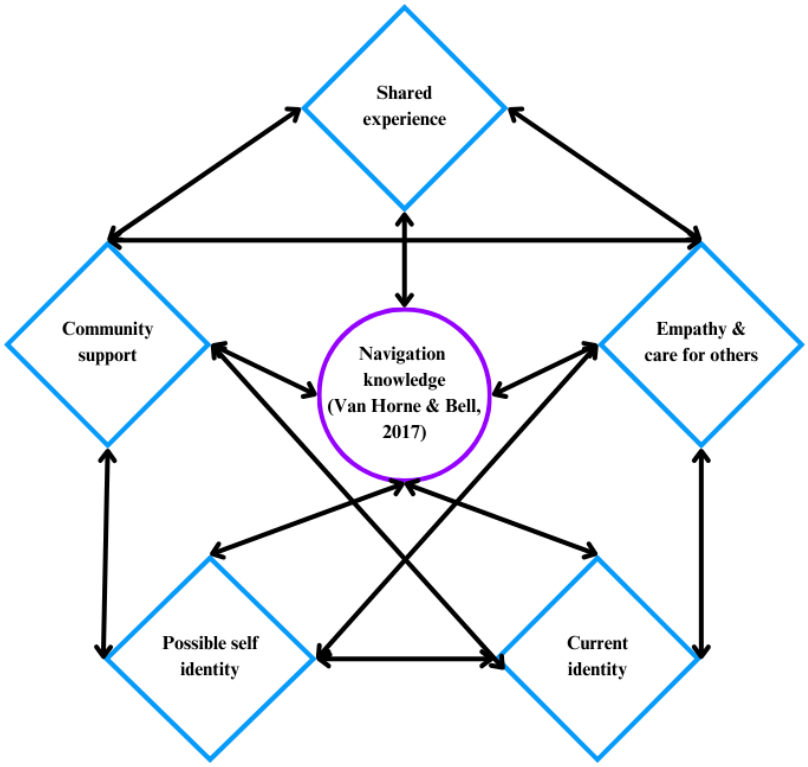
Multiple dimensions of community are enacted in just over a minute of conversation – all of which are directed toward achieving a self-concept aligned with confident public speaking skills. Cameron vocalizes their consideration around the formal presentation option (Turn 8.10) after learning other project groups were also open to the possibility (Turn 8.6), and the encouraging response it elicited from Mr. M (Turns 8.7 and 8.9). Other participants' interest in formally presenting their projects establishes an opportunity to engage in a shared experience across project groups and the responsive community support reinforces a positive association with full participation within the community of practice (Lave & Wenger, 1991; Wenger, 1998). Cameron expresses uncertainty while considering how to create a path from their current

identity, one who is unsure of public speaking, to a future self-concept embodying a willingness to accept the opportunity (Turn 8.13). Encouragement from multiple facilitators (Turns 8.14–8.17) strengthens the path toward realizing this possible self, while empathy and care are reflected in the acknowledgment of individual agency, community support for their authentic self, and encouragement to grow beyond current boundaries (Turns 8.18–8.22). Shared experience, care, and community support are leveraged concurrently when Ms. E suggests a facilitator can assist in the presentation (Turn 8.23) and continued support is expressed (Turns 8.24 and 8.25) to ease Cameron's uncertainty. While Ms. S directly references the achievement of a possible self identity as motivation for opting into the formal presentation (Turn 8.26) and Cameron agrees to take this into consideration while making their decision (Turn 8.27). As turn 8.5 indicates, all of the participants were within listening distance of this interaction – four of the groups were present in the vicinity, and the fifth was in a closely connected adjacent room. Almost exactly 24 hours later, all project groups chose to formally present their projects in front of an audience of their peers and industry professionals (Figure 13). Prior to the project group presentations (Activity 13, Table 1), each group was asked their preferred presentation format and they each independently selected to formally present in front of the audience. Throughout presentations, participants led the session with minimal guidance from facilitators. Every group answered questions from industry professionals in the audience regarding their design choices, project inspirations, and technology implementations. Each group received applause upon completion. After the final presentation, participants thanked the industry professionals for taking the time to join and share their expertise. This decision evidences participants taking meaningful steps towards actualizing future self-concepts.

Figure 13. Physical layout of the project group presentations. Participants are at the front of the room (positioned in the right side picture) and industry professionals are sitting amongst other participants in the audience.

Cooperating dimensions of community create impactful sociocultural learning towards possible self identification (Figure 14). Effective community-centered learning design fosters these multidimensional interactions and this study argues that cooperative dimensions enacted in connection with navigation knowledge stabilize possible self identification in adolescents.

Figure 14. Matrix of possible self identification cooperating dimensions of community.



LIMITATIONS AND IMPLICATIONS

At its essence, community-centered design requires unique, intentional customization to the community the learning environment is designed to serve. While this study establishes a matrix for possible self identification, caution should be exercised in generalizing this to other communities with differing cultural backgrounds, socioeconomic statuses, educational attainment, collective aspirations, and so forth. It is critical that community-centered learning design includes co-design efforts with community organizations to bring together diverse voices and skills in support of youth development and broader community advancement. Furthermore, taking up research in communities outside of your own memberships requires extreme care, awareness, and eagerness to receive and act upon constructive feedback from community

members. Designing community-centered learning environments must be approached with vigilance and sensitivity towards the needs, goals, and well-being of the centered community.

Stabilizing the defined matrix of possible self identification requires further implementations and iterations of the *Hack for the Future* workshop – both within the local community and beyond. Additional findings may inform approaches to achieving community-centered learning design at scale.

Future Exploration: Learning in Place

Hack for the Future establishes a foundation for future research to build on these findings through longitudinal studies that assess the effectiveness of this design. Additional research could focus on the impact of learning in place and leveraging professional environments as transformative learning spaces. By following participants across multiple workshops and tracking how many actively pursue a possible self-identity within technology pathways, such research could offer valuable insights into the long-term impact of cultural learning pathways across settings. These proposed studies have potential to extend the work of *Hack for the Future* and highlight the critical role of targeted education-to-industry pathway programs in fostering a more equitable and representative professional industry for future generations.

CONCLUSION

Community-centered learning design fosters dimensions of community within the learning environment which cooperate in multidimensional interactions to enact navigation knowledge towards possible self identification – an interconnected process defined in the matrix of possible self identification. This study offers meaningful insight on designing learning environments intended to develop disciplinary identities, especially those characterized by limited representation, access, and “outsider” social orientation. Key pedagogical implications include

the emphasis on community-centered practices and values in learning settings to encourage a sense of belonging and potential in education and beyond. Practical implementations to move towards community-centered learning requires the dismantling of hierarchical power structures within the classroom to empower students as innovators of both their individual and communal futures. It is our collective responsibility to design learning spaces that encourage students to explore the potential of their dreams and develop skills that can carry them on their journey forward. Community-centered learning design can achieve this vision – for the betterment of our youth and the possible selves they imagine.

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