Community Cultural Wealth from an Engineering and Science Education Department

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Abstract

Asset-based frameworks are used to describe the strengths that individuals bring to new situations, including graduate students joining a department. Community Cultural Wealth (CCW) was created with Communities of Color in mind to highlight the multitude of assets students of color possess. CCW uses familial, linguistic, aspirational, resistant, navigational, and social capital to describe students' strengths in and out of the classroom. These capitals appear in multiple settings and from many different sources. They also can be depicted simultaneously as a single capital cannot describe some strengths. For example, a role model for a student may provide both aspirational and navigational capitals simultaneously as they aid a student through the college experience.

The Engineering and Science Education (ESED) department at Clemson University created a space named "Lunch and Learn" ("L&L") to support graduate students, where students mutually support and grow their educational assets alongside their peers and mentors. We use a descriptive case study to investigate the experiences of graduate students within L&L. The research team conducted semi-structured interviews to investigate graduate students' experiences in L&L. Finally, we use open and axial coding to analyze and describe the themes demonstrating Community Cultural Wealth capitals.

Results demonstrate that graduate students' aspirational, linguistic, navigational, and social capital are augmented by L&L. Students interact with peers at various program levels, allowing younger students to glean additional knowledge, skills, and interests from older students. This interaction assists novice graduate students in persisting in their studies by reinforcing their aspirational capital. Advice and knowledge from experienced students in the program also add to novice students' navigational capital as experienced students provide perspectives about different educational pathways and career options during the program. Explicit and implicit messaging helps students feel connected and supported by other graduate students in the department, allowing a continued enactment of their social capital.

Index Terms

Student Diversity; Doctoral Students; Case Study; Learning Communities; Professional Development

I. Introduction

Graduate student well-being is a concern for universities and colleges globally. The growing crisis of depression, low self-esteem, and fatigue amongst graduate students is ubiquitous across disciplines and degree programs [1]. Reasons for these mental health issues are rooted in financial pressures [2], adviser expectations [2] and relationships [3], work-life balance [4], unstated expectations (hidden curriculum) [5], and, for many students, institutional or departmental discrimination [4], [6]. However, academic institutions and/or individual departments can promote student well-being by facilitating social support and a healthy departmental climate [6].

Community Cultural Wealth (CCW) can help describe graduate students in many ways. When graduate students draw upon their friends, family, and community, they can feel supported when feelings of isolation threaten to overwhelm them [7]. Using a Critical Race Theory lens on cultural capital, society, including universities, can shift ideas of the cultural capital strength students bring to the space. This shift could change the White middle-class definition of strengths and recognize the assets graduate students, especially Students of Color, bring to the research. This shift could help students with imposter syndrome or feelings of inadequacy by realizing the strengths that they bring to their studies. By forming a graduate student community within their research group, department, or the graduate school itself, these groups can support students as they persist through their studies.

Semi-formal community-based spaces often are created within departments to support graduate student growth and well-being by leveraging the capitals students possess [8]. Semi-formal spaces can develop and enact navigational and linguistic capital as graduate students become independent researchers through progressing towards their degree completion by learning academic communication. In these community-based spaces, graduate students can navigate implicit aspects of their discipline and cultivate relationships with others in their institution and department [9]. Graduate students who utilize semi-formalized spaces may find a deeper sense of belonging to their discipline and engagement in their department [8]. Graduate students rely on the social capitals they bring to their departments as well as supports provided to them to succeed in their education. [10]

Within Clemson University's Engineering and Science Education Department (ESED), a semi-formal space called Lunch and Learn (L&L) was created to provide support to graduate students. We describe the strengths and supports that ESED graduate students bring and find in the L&L space to address the following research questions:

- What are the strengths and Community Cultural Wealth capitals that graduate students bring to the Lunch and Learn space?
- How has Lunch and Learn supported those strengths and Community Cultural Wealth capitals?

A. A description of the case under study

Around 2010, informal graduate student lunch conversations were semi-formalized by faculty and graduate students in Clemson's Engineering and Science Education Department (ESED) and began meeting once a week to discuss education research. The ESED department is comprised only of graduate students, associated faculty, and staff. Over time, this meeting became more formalized, and was given the title Lunch and Learn (L&L). L&L was deemed a space where education researchers within the department could build community, discuss literature, and collaborate. The meeting time was moved to after-departmental seminars to allow opportunities for discussion and insights from the visiting education researchers. Eventually, some number of faculty fully expected their students to attend this space while others retained the optional attendance attribute. Two graduate students from ESED were dubbed L&L leaders and acted as discussion facilitators. These leaders rotate every two years to allow new perspectives and ideas into the space and are selected through volunteers. L&L strives to promote student strengths by facilitating peer discussions about education research, workshop participation, and socialization. ESED conducts education research in many STEM disciplines, cross-pollinating discipline-based education research across fields represented by both graduate students and faculty.

We use Community Cultural Wealth as our theoretical framework to highlight student strengths in this interdisciplinary ESED department as they are expressed by the students within the L&L space.

II. Positionality statement

The research team would like to briefly present our positionality to better describe the research process and acknowledge possible biases in our work. All three research team members are emic to the study population and have participated in organizing the L&L event. Research team members at the time of data collection were in their first, second, or third years in the department. We would like to acknowledge this work is our interpretation of experiences that we share.

Because we share the experience of this population, we would like to present this work as a report of how we interpret these student strengths expressed by our peers. We find inspiration in our peers and would like to present these particular statements and experiences to the community.

III. Theoretical framework

Community Cultural Wealth (CCW) was conceptualized by Yosso [7] in 2005. For Yosso's 2005 work and for ours, we use culture to refer to behaviors and values that are learned, shared, and exhibited by a group of people. CCW was guided by tenets of Critical Race Theory to formally acknowledge specific ideas of cultural knowledge within marginalized communities. The different forms of wealth in CCW are the following: *familial*, *linguistic*, *aspirational*, *resistant*, *navigational*, and *social* capital. These capitals were originally used to recognize Chicana/o knowledge, skills, and talents previously overlooked by dominant ideologies of strengths [11]–[13]. Since CCW's original conception, it has been expanded to observe the strengths of various Communities of Color in college or college-bound settings [11], [13]–[16].

Familial capital is the "cultural knowledge" [7] that is created among people that are considered family or kin. This includes people who are not blood relatives and involves the history and memory of a community. *Linguistic capital* involves the skills to communicate in multiple languages and styles among different groups of people. This can include code switching, speaking in different dialects, and knowledge of different social expectations. *Aspirational capital* involves an individual's ability to preserve their goals for the future despite potential obstacles. The obstacles in the path of the individual can be either tangible, such as financial - or perceived, such as being caused to feel inferior to others. *Resistant capital* is the skills learned when an individual continues to persevere in the face of obstacles. A key aspect of resistant capital is that the individual's behavior challenges the inequities observed. *Navigational capital* is the ability to traverse multiple types of institutional structures not intended for People of Color. These could a Person of Color's ability to navigate the bureaucracy of a predominantly White institution (PWI). Finally, CCW includes *social capital* which is the community an individual surrounds themselves with to access resources. Social capital differs from familial capital because familial capital requires a higher level of closeness or kinship.

We use CCW to explain the forms of strengths, skills, and knowledge that graduate students in ESED at Clemson University bring to the L&L space. The graduate students interviewed for this study are historically underrepresented minorities in their various STEM fields. Participants in the interviews were People of Color, identified as women, or both. However, due to the small size of the department, we are unable to specifically identify the demographics of the individuals interviewed to maintain their anonymity. CCW has been used as an asset-based theory to describe the cultural knowledge brought to higher education by historically marginalized groups [17], [18]. Therefore, we believe that CCW is an appropriate theoretical framework to use in describing the assets of the interviewed graduate students as well as to describe how the L&L environment augments these capitals.

IV. Methods

Our work uses an intrinsic case study methodology [19] to discuss the situation and wealths that the ESED students find and bring. A case study was chosen to most accurately report the context of the ESED and the contextualized descriptions that students report of their experiences within it. Specifically, an intrinsic case study is used to more deeply understand the case itself. We define our case to be the ESED department with the L&L space and the individuals that comprise them. We conceptualize the ESED culture as values and norms which prioritize diversity, equity, and inclusion with an emphasis on community engagement. Expectations for department members center around involvement in additional community-building events and collaborations between other students and faculty. We choose to interview students rather than faculty in order to focus on the strengths that students bring to graduate school and see in L&L rather than the resources provided by faculty. Our unit of analysis is the L&L space within the ESED department.

We rely on Lincoln and Guba's [20] conceptions of trustworthiness and credibility to consider the quality of our work.

This study interviewed seven of the total twenty-five full-time doctoral students within ESED during a five-week period from December 2022 to January 2023. Participants were randomly selected from stratified samples based on time in the department. Three students had little time in the department (less than a year), one student had moderate time in the department (between one and three years), and three students had a high time in the department (more than three years). The ESED student population had very few students that classified into the moderate time in program, leading to only one student being available to interview from this group. This stratified sampling strategy was selected to give as complete a picture as possible of the strengths the students and community have held over time. With only one participant from the moderate time in department group, our interpretations rely on distinguishing novice from experienced members of the department contextualized to each statement. Additionally, there is a very small number of international students enrolled in ESED, but they were unable to interview with us due to scheduling issues. International graduate student experiences are therefore out of scope for this work.

Two of the research team members conducted semi-structured interviews, which lasted between 10 and 61 minutes, with an average time of 29 minutes and a median of 27 minutes. The third research member did not conduct interviews to increase data trustworthiness as this member had the highest likelihood to bias participants because they had spent the most time in the department. Questions were framed around the participant's feelings of support from the L&L space, descriptions of the culture of the space, and any impacts the space had on the participant. We chose not to use specific framework terminology during the interview process as the participants were likely aware of the frameworks and would tailor responses to match the framework rather than describe their thoughts and experiences. Our interview word choice is intended to increase data trustworthiness in this way. Initial codes were formed from the 2005 Yosso [7] descriptions of CCW and used for all interview transcripts by all research team members. This deductive process was followed with axial coding [21] to identify the nuances and overlaps between the capitals. All research team members coded approximately an equal number of interviews. Two meetings to coordinate and correlate emerging themes and to verify inter-rater reliability occurred during data processing.

The research team interpreted all capitals discussed by Yosso [7] into the context of the L&L graduate student community. These contextualizations are presented in table I.

V. Results

A. Graduate students connection to other L&L members through their social capital

Social capital was the most commonly identified, discussed, and cultivated strength within L&L. Participants interviewed for this study often discussed their connections with their peers as an effect of the space. During the COVID-19 pandemic lockdowns, the L&L community decided to direct the intention of the space toward encouraging social connections among the members. Previous goals were to form a STEM education research discussion group with an emphasis on the material being discussed, however for the mental health of its participants during the lockdowns, the goals were altered to also incorporate promoting socialization. The L&L community chose to augment the existing social capital of its members to continue personal

Cultural Wealth	Code Definition
Aspirational Capital	Students observing other students' skills, knowledge, and interests and becoming inspired to work towards also having those skills, knowledge, and interests.
Familial Capital	Kinship among other graduate students or within the graduate students' research groups. Feeling supported through close ties.
Social Capital	A feeling of social connection with other graduate students, regardless of professional or academic requirements. "Networking" "meeting people" "getting to know others" etc.
Navigational Capital	Support and knowledge to navigate through the ESED department, ESED curriculum, or Ph.D. research.
Resistant Capital	Any action that pushes back on power structures experienced by graduate students. Could be a faculty/student, newer/older student, etc.
Linguistic Capital	Talking like an academic - the vocabulary, values, and structure of academic arguments as practiced by the department to communicate with other discipline-based education researchers.

TABLE I
CONTEXTUALIZATIONS OF COMMUNITY CULTURAL WEALTH CAPITALS INTO THE L&L SPACE.

connections and develop new ones within the space. The L&L space provides a dedicated time for graduate students to connect with one another and reinforce the social capital the members bring to the space. A current member of the space recalls the initial impact of L&L on their graduate experience:

"I remember **meeting a bunch of people** at lunch. So I feel like that was impactful in the sense of like, it was probably a reason for coming here because **I met so many people.**" – Participant 6

Participant 6 describes their social capital growing as a result of L&L. They were able to meet different people within their graduate community and continue to grow their connections to the members of the L&L space. Another member describes the impact of the space on their social capital as well. While participant 7 originally had other connections to people within their graduate community, they described their impression of the overall culture of the space as such:

"It was positive, because Lunch and Learn was the **first time that I met a few people** in ESED that I'd never like talked to before. So it was nice to **put a name to a face** that was positive interacting with colleagues, not colleagues interacting with professors that I don't have." - Participant 7

Participant 7 mentions that through L&L, they was able to meet people within their graduate community that they were aware of but where there was not previously a connection. Participant 7 takes the social capital that they previously had within their graduate student community and uses L&L to augment it by creating additional connections to the L&L members. The social capital supported through the space helps members create a strong community. The community that resulted from L&L continues to add to its member's pre-existing social capital. The cultivation of these relationships in L&L is also reflected in the culture of the space, as described by participant 5 .

"[L&L] is kind of a very **open, inclusive culture**. It's very similar to the ESED culture. [...] Everyone seems to like, **get along**. They're **happy to see one another and talk**." - Participant 5

Participant 5 describes the culture of L&L as inclusive and open. Their statement shows how social capital is facilitated through L&L, as it promotes an environment where individuals feel welcomed while they join together to discuss education research.

L&L provides a semi-formal space to develop graduate student relationships. The semi-formal register of the space is intended to simultaneously meet two goals of being an easy-to-access, inclusive event while also providing a platform for academic debate and collaboration. A member of the L&L community describes the first goal:

"So one of [the purposes of L&L] is kind of like this goal of like **building community amongst grad students**, and like **getting to know each other**, and like being there **supporting each other**. **Community**, right?" – Participant 3

Participant 3 restates one goal of L&L as a community-building space within the department. During L&L, students continue to bring their social capital from their previous lived experiences to build a strong social community.

B. L&L augments graduate students' navigational capital in higher education

The ESED department requires a background in a STEM discipline by requiring a master's degree is completed either before or during the completion of the earned doctorate degree. A result of this requirement is that the student population is comprised of many STEM backgrounds, as well as previous lived experiences of graduate students navigating many departments and disciplines. The graduate students' previous lived experiences in other STEM graduate-level departments can lead to difficulty interpreting mixed messaging when navigating various academic spaces. For example, there are academic spaces where informal

interactions between graduate students and faculty is encouraged and the hierarchy between graduate student and faculty is minimized. In contrast, there are also academic spaces where formal interactions and expectations between graduate students and faculty are a strictly maintained hierarchy. These differences in academic departmental communications can cause confusion about the level of formality the student should apply. When a graduate student considers these power dynamics, it can be difficult to traverse academic departments. These power dynamics can be seen between graduate students with different levels of experience as well as between graduate students and faculty, including their own adviser. Previous graduate student discipline experiences about expertise and formality can promote strong divides between community members. In the L&L space, graduate students and faculty are encouraged to self-reflect on these hierarchies and acknowledge all members, both experienced and novice education researchers, as contributing to L&L.

The expectations of power within the L&L space are reflected by the consensus of members that form the space. Within L&L, all students, graduates and undergraduates, and faculty are asked to speak respectfully but casually to each other. This includes the removal of titles for the faulty, where they are referred to by their first names. This encourages the participation and feeling of inclusion and contribution to the community of all members. Participant 1 illustrates this point well:

> "I guess the more positive things that came out of lunch [and] learn is, it has helped me **not be so scared of faculty**. like I come from a department where it's like **faculty way up here**. [gestures with hand to high location] **Students and grad students are down here**! [gestures with other hand to low location] Like: "we're better than you! We know things!" but **Lunch and Learn kind of evens that space.**" - Participant 1

In their reflection on L&L, participant 1 explains how the space helped them to navigate power dynamics and professional hierarchies within ESED. While participant 1 came to the department with their own navigational capital (from their previous discipline), L&L helped participant 1 to understand how this strength may apply differently in different departments. For graduate students in ESED who come in with some graduate school experience from other institutions and disciplines, utilizing their existing navigational capital can be vital to success in their program.

L&L also promotes navigational capital as students can hear from more experienced education researchers and how these individuals made it through their own graduate school experiences. The ESED department is comprised of many graduate students from different disciplines, stages of their life, and pathways to graduate school. Thus, L&L provides a space to augment graduate students' previous professional navigational capital through interacting with many perspectives. Participant 5 further explains below how there are multiple paths that other graduate students have followed and different paths they have planned for themselves:

> "Because I feel like, you know, everyone is at a different path or something. I don't know exactly what that looks like, but for me [I am interested in] a workshop or a talk about how someone finalized their research question or their area of their direction of interest. Or, you know the like, I feel like that supporting graduate students, and, like their process of like completing their degree. Ju1 st cool."
> - Participant 5

They believe that the L&L space can be used to explore potential paths for graduate students during their time at their institution. Several of the graduate students in the L&L community have navigated graduate school before joining the ESED department, developing navigational capital for a STEM discipline and graduate school. The navigational capital of all ESED students can be augmented through their connections in the L&L space. This could be through considering traversing power dynamics of different disciplines as explained by participant 1 or as participant 5 describes learning the different paths peers took to join and thrive in the department.

C. L&L encourages existing linguistic capital aiding in the interdisciplinary nature of Discipline Based Education research

The ESED department promotes disciplinary and personal diversity. Student and faculty voices all contribute their STEM dialects to the space, informed by a wide variety of education and research. In the L&L space, members are able to bring in their own passions and interests to the entire community. As graduate students spend time in their respective disciplines, they learn the unique terms, phrases, and connotations specific to that discipline. These dialects add to the linguistic capital they bring to their new department, ESED. In an interdisciplinary department like ESED, students not only bring in their own linguistic capital specific to their personal and disciplinary backgrounds but the foundations of a more general researcher jargon. L&L brings individuals of different disciplines together where they share their own discipline's language while expanding their knowledge of the nuances of education research language. Participant 6 shared their experience in L&L of interacting with a faculty member from a different discipline:

"**I couldn't tell you what about mechanical engineering** even if it's not mechanical engineering like it just might be engineering like I really don't know. And so, having that space where, like [an expert in mechanical engineering] is there and [education research] that opened I don't know their mind to the field of engineering education like that would be **interesting and impactful to hear from.**"
- Participant 6

While there are several graduate students in ESED with graduate degrees in mechanical engineering, participant 6 earned a graduate degree in a different discipline. Nonetheless, they explain how hearing an engineer integrating expertise in mechanical engineering into their engineering education research can be impactful. They also highlight that using information from literature or articles helps inform the perspectives of someone from a different discipline. This promotes their existing linguistic capital by integrating the vocabulary of discipline-based education research into their knowledge of their discipline background.

Participant 6 reflects that this integration is an important component of the L&L space. In this instance, the L&L space facilitates introducing a graduate student to a new field (engineering education) and way of thinking about education research - in the context of that field. Finally, the vocabulary to communicate with others in education research is added to this student's knowledge base. By bringing in linguistic capital from individual disciplines and converging them in L&L, graduate students are able to add additional jargon and ideas spoken by different STEM disciplines to their existing linguistic capital, even when there is no faculty in the department that shares the student's STEM background. Participant 5 provides further evidence for how L&L promotes this sharing of linguistics and ways of thinking in their statement:

"I feel like I'm **always enlightened** about the situation, or whatever we may be discussing, and I always find something like it's interesting to see that **I'm thinking one way**, and **someone may be thinking another way**, and I would have **never thought to think about that**" - Participant 5

Participant 5 explains how their way of thinking has been "enlightened" by the L&L space and by the perspectives others have brought to the space. Their statement requires their previous linguistic capital of their own discipline, their acquired knowledge of the vocabulary used in education research, and the ability to transfer the education research jargon from other disciplines back to their own discipline. This reflects one major outcome of L&L, to expand the linguistic capital of its members coming from various disciplines.

Students use this interdisciplinary linguistic capital expertise as they speak about STEM education research. This culmination of interdisciplinary language within the L&L raises awareness of how different STEM disciplines approach problems and bring their values to solutions. Participant 4 describes below the nature of communicating research with their colleagues in their discipline separate from ESED:

"That's because of my like my [professional] bias, I guess, from like the math from math discipline, like you know, in math, math is somewhat flexible. But there's also... **problems in math that are well defined and so well-defined problems generate like a correct answer, or maybe a correct set of answers.**" - Participant 4

In this statement, participant 4 describes their disciplinary background as a mathematician and how this influences the way they describe and communicate his research to others. They also uses this as evidence to how this differs from their understanding of education research through their next sentence:

"**But education research is not that way,** where there is always a correct answer." - Participant 4

Participant 4's statement indicates how many graduate students in the ESED department use their linguistic capital from their specific disciplines within education research. Similar to other graduate students within ESED, participant 4 brings their disciplinary expertise into the L&L space; which melds with the language from other STEM disciplines, resulting in a rich method of communicating research to people in and outside of the space. In another statement, participant 4 also explains how they value the linguistic capital others bring.

"It's important to hear all these different perspectives, including those from other departments and other institutions."
- Participant 4

Participant 4 reflects on the importance of having individuals from different STEM disciplines within the same department. This sentiment aligns with participant 4 's earlier self-reflections on their disciplinary expertise and how these impact their views on education research. The range of perspectives brought into the L&L community increases the linguistic capital of

all members. New vocabulary is required to communicate different perspectives to people with different STEM backgrounds. The new vocabulary can then be absorbed and utilized in the existing linguistic capital of its members. In ESED, these perspectives are highly valued and enhance the ability to conduct interdisciplinary research. L&L allows for students who share this participant's values to express that desire for collaboration with their peers.

D. Graduate students use aspirational capital in L&L while learning to become a researcher

The graduate student-faculty mentoring relationship is a core experience of the graduate school experience. The ESED department encourages students to seek this mentorship from all faculty in addition to a student's primary advisor(s). More experienced graduate students also act as mentors for newer students, helping novice graduate students to see how their graduate student careers may progress. During L&L, more experienced students often volunteered for further discussion with novice students as topics are brought up and the needs of novice students are identified. The mentor network encouraged by the department and the L&L space provides students with multiple sources of aspirational capital as the mentors demonstrate the possibilities of education researchers.

The L&L space capitalizes on the expertise of experienced department members by encouraging senior students and faculty to attend and provide their own insights into education research. Participant 2 remembers how they felt about being in a room of education researchers as a new student:

> "I was **new to education research**. So I was just really using that space as like a time to like, get to hear, almost like **learn at the feet of the masters** right like get to hear like how the **other students and the other faculty were engaging with the literature**. Get to be **exposed to some new ideas.**" - Participant 2

Both as a novice and now as a more experienced graduate student, participant 2 values learning from other students and faculty and seeing the potential for their own research goals. This participant went on to express a similar sentiment as participant 1 about the importance giving back to the L&L community through encouraging novice education researchers to enter the L&L space. We interpret this as a student providing their aspirational capital to younger L&L members by prioritizing being a role model for them. Initially they were aspiring to learn from the "masters" of education research where their goal was to become a full member of the community. As she grew in her role as an experience education researcher, she has increased her aspirational capital. She continues to learn from senior educational researchers, while simultaneously desiring to give back her expertise to novice educational researchers. Several experienced graduate students positioned themselves as role models and access points to ESED through L&L, allowing their own aspirational capital to grow to include their old and new goals.

Graduate students face many obstacles as they achieve milestones and develop their dissertation topics. However, the ability to learn from the "masters" and see who they may become as education researchers, helps to augment their aspirational capital as research students. Aspirational capital can also be seen in graduate students as their future research or career. The L&L space allows graduate students to further realize aspects of their own aspirational capital. participant 5 below describes a conversation among a speaker that was invited into the L&L space, a colleague, and herself. Through this conversation, she recognized additions to her aspirational capital as a result of the L&L space that involved her future career and research.

> I don't remember [the speaker's] name, but the paper talked about mentors, and how graduate students were mentored. And it just reminded me that the work that I want to do, and similar to work that [fellow graduate student] wants to do. **What we want to do is still important**... - Participant 5

The conversation described above encourages participant 5's existing aspirational capital through reinforcing her belief in the importance of the research topic. The L&L provided the space for the interaction and the continued persistence towards participant 5's future research. L&L provides the opportunity through internal and external faculty and graduate student engagement for students to see their goals realized in others. This student further deepened their aspiration to become an education researcher when they were able to continue a conversation with a visiting speaker in L&L. Graduate students enroll in their programs for many reasons. However, at the moment of enrollment, graduate students may not have fully developed research interests and agendas. Rather, the connections formed in orientation and in their first year at their graduate school can augment the aspirational capital that enabled students to apply. Participant 5 indicated this when they were reflecting on the connections they were developing in their first year:

> "The biggest thing coming in was just not knowing enough about the department or being exposed to the entire department enough. You **know all the research**, **all the advisors** like, **you know all the possibilities**." - Participant 5

Participant 5 mentions that there are multiple directions for their education research to travel as they see through observing the faculty members of ESED. They mention feeling as if they did not know enough when initially joining ESED, however, her aspirational capital grew during this time. She originally aspired to join ESED, and then when she was accepted, her aspirational capital changed to begin to desire a specific research topic. Through the L&L space, participant 5 was exposed to various faculty members, graduate students, speakers, and thereby new education research.

VI. Discussion

The ESED case provides insights into graduate students' strengths and assets within semi-formal academic spaces. The capitals they bring to the space are augmented through interactions within the community of L&L. The results of this study provide insight into the research questions: 1) What are the assets, strengths, and Community Cultural Wealth capitals that graduate students bring to the L&L space? 2) How has L&L supported those assets, strengths, and Community Cultural Wealth capitals?

The members of the L&L community had several strengths outlined with CCW that were augmented by the space. Social capital was most commonly identified in the interviews by the researchers. The graduate students' existing social capital helped them form new connections with members of L&L. Interview participants agreed the established social capital of the members of the space formed an "open, inclusive culture." They also agreed that the L&L space provided a community among the graduate students, allowing them to continue to connect with each other and grow their ongoing social capital. Navigational capital was an additional capital seen in the interviews where the preexisting knowledge was encouraged and transformed by the L&L space. Members of the L&L space spoke of the navigational capital they brought into the space that revealed their knowledge of power structures within academia. L&L gave members new perspectives on how to navigate academic spaces. Whereas in previous spaces, graduate students were seen at a "lower" level than the faculty, L&L demonstrated that it was possible to have all members, undergraduate students, graduate students, and faculty members exist with the same ideals of being interested in discussing education research.

Linguistic capital was another previous strength of the members of the L&L community. The diversity of both graduate and undergraduate degrees, as well as a variety of lived experience held by its members provide them with unique, rich language to communicate about education research. Interviewed participants agreed that the L&L space provides them with new perspectives and vocabulary by gathering a group people from multiple disciplines with a common goal to discuss education research. As participant 4 describes, education research often has several "correct answers" and multiple ways to solve current and upcoming issues. Therefore, students need to continue to grow their existing linguistic capital to effectively communicate with others in the space and with people in their respective disciplines.

Existing aspirational capital was supported in the L&L space as well. Graduate students thought back to when they were beginning in education research. L&L provided a group setting for people at all levels of their academic career to discuss education research. This allowed novice members of L&L to interact with members more advanced in their academic career. Through these interactions, L&L members supported their own aspirational capital by being able to view people farther along in their careers and envision themselves in similar positions in the future. Graduate students were also able to augment their own aspirational capital through being introduced to different research and different paths in academia. One of the interviewees was inspired to focus on her future research topic through L&L interactions. This demonstrates how its members brought aspirational capital into the L&L space, and it was then supported through the same space.

The capitals of CCW are often interwoven with each other. After reviewing the interviews, researchers observed social, navigational, linguistic, and aspirational capital as strengths that graduate students brought to the L&L space and were augmented by the space. Social capital can be seen in the interactions among the members of the community, however aspirational capital can also appear in these interactions. When members of L&L observe others in the space who are more advanced in academia, the interactions can augment the existing aspirational capital of the graduate students. This connection with members that encourages the growth of current social capital, also can inspire additional aspirational capital.

Social capital also can be perceived in the remaining two capitals, linguistic and navigational, that were uncovered by in the interviews. While these strengths in graduate students are unique and distinct, social capital can also help progress these remaining assets. The personal and professional connections made through social capital give students additional knowledge to use and their own to navigate academic spaces. Connecting with other graduate students through L&L that have expertise in multiple disciplines also assists with the continued growth of linguistic capital. As graduate students meet and interact with other members of the L&L community, they add to their existing knowledge and vocabulary to communicate education research.

VII. Limitations

Our work is constrained by limitations impacting our results' transferability, dependability, and confirmability. While typical in many ways, the ESED department and L&L spaces are unique for the contexts they provide to students. Interdisciplinary departments are still atypical in higher education, including at the graduate education level, meaning that transferability for our results is low. The students we interviewed were highly varied in the frequency and methods of interacting with L&L, reducing the dependability of the space's influence on the student. Finally, because of the insider status of the interviewers combined with the awareness of the Community Cultural Wealth framework by the participants, confirmability is also low.

VIII. Implications

Our findings have several implications for supporting graduate students in engineering and science education. Faculty and staff can make deliberate efforts to support and augment the Community Cultural Wealth capitals that graduate students bring to their programs. For example, by framing community building spaces to allow a graduate student to use and build their existing capitals rather than time where students are assumed to have no prior experiences. By acknowledging that students can contribute to each other in many ways, students are encouraged to utilize their social capitals to the fullest.

Faculty and staff should also be aware that students in graduate school do not come to the program as blank slates. The graduate students have a multitude of experiences in their life that have motivated them to complete their undergraduate degree. Students likely also have real world experiences in their field, personal situations, and academic situations. It is important to view graduate students holistically, and faculty and staff should consider how best to support graduate students through the students' existing capitals and strengths.

IX. Conclusions

Graduate student well-being is the foundation of a good graduate school experience and a strong predictor of graduate student success. Graduate students in ESED utilize their social, navigational, familial, linguistic, and aspirational capitals to provide a foundation for promoting their own well-being. Within ESED, L&L is structured to promote and augment these assets through community and professional development. These results provide evidence of the close relationship between semi-formal learning spaces and innate student capitals. For graduate students who become members within these spaces, the augmentation and promotion of their capitals can assist them in navigating graduate school and achieving professional goals while maintaining mental and emotional health. This is critical for students engaged in interdisciplinary research (such as those in STEM education) as they navigate hidden curricula between various disciplines in their research pursuits. Our case study examines the perceptions and understandings of students engaged in a STEM education research space.

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