UNIVERSITY OF CALIFORNIA SAN DIEGO

An examination of cultural assets in Latinx student persistence in premedical studies

A Dissertation submitted in partial satisfaction of the requirements
for the degree Doctor of Philosophy

in

Education

by

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2022

The Dissertation of Katherine Arias Garcia is approved, and it is acceptable in quality and form for publication on microfilm and electronically.

University of California San Diego

2022

DEDICATION

Para mi mamá

Esperanza Arias Cayetano

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ACKNOWLEDGEMENTS

The completion of this doctorate would not have been possible without the support from my family, friends and mentors. Gracias mami y papi, por todo el apoyo que me han dado toda mi vida. Yo no estaria aquí sin el amor y el sacrificio que han hecho por mí y mi hermana. Este logro es para toda la familia. To my sister, Elizabeth, thank you for always picking up the phone and family support. To my nieces and nephew, Aliza, Ana and Nico, remember we come from a special Peruvian family and I can't wait to see you all shine. Lastly to my husband, Edgar Garcia, DPT, we did it! Our love, dedication and support has been life-changing. Thank you Edgar, for the unconditional love and non-stop support.

Being a first-generation college student, everything was new and I was so lost at UCSD. Thank you to the organization Movimiento Estudiantil Chicano/a de Aztlan (MEChA), the first space on campus that made me feel seen. Thank you to my mentors, that I met through MEChA, Juan Carlos Astorga, Agustin Orozco, Dr. Patrick Velasquez, Dr. Jorge Mariscal and Dr. Myrna Garcia, you all showed me that this little brown girl had something to say, you've helped empower me and find my voice and survive UCSD. To my college-life friends, Jessica Perez-Corona, Grisel Guijarro, Haydee Salazar, Dr. Miguel Pinedo, Miguel Torres and Jose Ccallocondo, thank you for being there from the beginning until today. Jessica and G, love you mujeres, thank you for taking care of me. Also to Dr. Maria Nieto Senour, one of my first Chicana's professor, thank you for showing me care and love through CBB which transformed my life. I obtained a PhD for the community and to continue the movimiento. La Lucha Sigue!

To my UCSD Chair and advisor, Dr. Frances Contreras, thank you for your guidance, cariño and support in my PhD Journey. Your consejos were pivotal as I navigated my studies

and my research in centering Latinx students in higher education. To my committee members, Dr. Happy Araneta, Dr. Sam Museus, Dr. Amanda Datnow and Dr. Alan Daly, thank you for uplifting me through my dissertation and allowing me to blossom in higher education research. To my cohort, thank you for your consistent support all these years. To Mayra Puente, Brianna Ramirez, Ruby Osoria and Samantha Prado Robledo, gracias por el apoyo, cariño and giving me space to authentically be me in academia and space to grieve. I am forever grateful to have you all along on this academic journey and so joyful that Latinx students have you all as Professoras in their classrooms.

To all my former students from Upward Bound/Talent Search/HCOP to Summer Bridge, your trust and support has built my foundation to ensure you have access and that institutions of higher education respond to your needs. To my PRIME-Health Equity familia, social justice physicians, doctores y doctoras, thank you for coming with me on this PhD journey. Your patience, commitment to social justice, no fear in calling out the culture of medicine and shatter the patriarchy, fueled me with inspiration and to pursue my PhD in Education, to fight this fight together. Thank you to Dr. Willies-Jacobo, for your support from the beginning at UC San Diego School of Medicine and introducing me to academic medicine and conducting equity, diversity, inclusion in medical schools. Thank you to the Office of Diversity & Community Partnerships, Dr. Luis Castellanos, Dr. Happy Araneta, Judith McGilvray, Isabelle Azoo and Ramon Hernandez for support throughout these years as I worked and finished graduate school, gracias.

Lastly, to my participants in this study, thank you for the trust and sharing your stories and your family's stories with me. I hope you see yourself reflected in this dissertation. I am

not done yet, there is still work to do for the many Latinx premeds in California. I invite you all to ‘give back’ as you all enter medicine.

Chapter 2, in part is currently being prepared for submission for publication of the material. Katherine Arias Garcia was the primary researcher and sole author of this material.

Chapter 3, in part, has been submitted for publication of the material as it may appear in Journal of Latinos in Education. Katherine Arias Garcia was the primary researcher and sole author of this material.

Chapter 4, in part is currently being prepared for submission for publication of the material. Katherine Arias Garcia was the primary researcher and sole author of this material.

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FIELD OF STUDY

Major Field: Education Studies
Transforming Education in a Diverse Society
Professor Frances Contreras

ABSTRACT OF THE DISSERTATION

An examination of cultural assets in Latinx student persistence in premedical studies

by

Katherine Arias Garcia

Doctor of Philosophy in Education

University of California San Diego, 2022

Professor Frances Contreras, Chair

Only 5% of the graduates from medical schools identify as Latinx (AAMC, 2019). While, in the state of California, the growing Latinx and bilingual community is expected to exceed 40% of the state's population with only 5% Latinx physicians (Martinez et al., 2019). Diversity of the physician workforce is important because underrepresented students are more likely to work as a physician in underserved communities, such as urban and rural

communities (Mitchell & Lassiter, 2006). The field of higher education is lacking research on Latinx student persistence in premedical studies in higher education. Moreover, the literature on underrepresented STEM students is lacking an analysis of the cultural assets that Students of Color bring with them into STEM. Through this dissertation, I advance STEM research by applying asset-based theoretical frameworks and culturally relevant methodology in order to center Latinx first-generation premedical students voices and experiences.

Guided by the following theories, Community Cultural Wealth (CCW) (Yosso, 2005), Latinx STEM Student Success Model (Rendón et al., 2019) and Chicana/Latina Feminist Epistemology (Fierros & Delgado Bernal, 2016), this dissertation aims to take on an asset-based approach and use culturally-sensitive methodology to understand the persistence of Latinx students in medicine. Yosso's CCW (2005) provides a foundation in viewing students of color entering the college environment with cultural assets and to further center Latinx premedical students, the Latinx Student STEM Success Model (Rendón et al., 2019) is applied to explore Latinx cultural assets, strengths developed from families/communities and knowledge that Latinx students have gained that are related to the Latinx asset (Rendón, Nora & Kanagala, 2014). Additionally, I employ pláticas, a culturally-sensitive methodology that draws from Chicana/Latina Feminist Epistemology (Fierros & Delgado Bernal, 2016), which acknowledges and centers Chicana/Latina scholars way of knowing and knowledge (Fierros & Delgado Bernal, 2016). This study is based on twenty four Latinx premed students from a large research university, an emerging Hispanic-Serving Institution. Each participant completed two pláticas, for a total of forty-eight pláticas, observations of the Latinx Premed Initiative sessions and website content review of activities.

Findings are presented in the three articles focusing on cultural assets of Latinx students during their undergraduate years, such as navigational, resistance, giving back and a methodological article. This study presents novel findings of the use of cultural assets of Latinx students in premedical studies. Latinx premedical students use the following, navigational and resistance asset as they navigated the COVID-19 pandemic and giving back asset is related to student's physician career aspirations to serve underserved communities and address health inequities. Additionally, pláticas methodology is introduced to call for a reframing of methodologies in STEM education research to provide a culturally relevant methodology to engage Latinx Students and advance STEM education research on Latinx students. Research on Latinx STEM students has focused on the attrition of Latinx students in STEM, however I find that Latinx students are persisting and creating meaningful pathways for themselves that is inclusive of their cultural background.

This dissertation is significant because it provides an asset-based approach and culturally sensitive use of pláticas on Latinx students to identify the cultural assets Latinx students use as they persist towards medical school. I also provide recommendations for institutions of higher education to embrace and leverage cultural assets, to reimagine graduate pathways for Latinx students to persist towards their medical dreams.

CHAPTER 1

Introduction

Over the past thirty years, policy makers and researchers have focused on addressing the physician shortage in the United States through policy initiatives, programming and funding initiatives. In addition to the physician shortage, the United States also faces a shortage of diverse physicians, such as Latinx physicians to serve the rapidly changing demographics of the United States population (Hayes-Bautista et al., 2000). In order to better develop and prepare a diverse physician workforce, institutions of higher education must ensure the retention and persistence of Latinx students during their undergraduate years in premed studies. Although much attention has gone into STEM fields in the past thirty years, the research literature on the subgroup of premed student population remains limited. Especially the subgroup of Latinx students pursuing premed studies has not been addressed within higher education literature in regards to their unique needs in retention and persistence in premed studies.

Moreover, the majority of STEM research focuses on the United States lagging behind in the production of STEM students, particularly students from underrepresented minority (URM) backgrounds such as Latino, Black and Native American students. URM student graduation rates lag in the STEM fields for URM students compared to Whites and Asian students (National Center for Science and Engineering Statistics, 2021). For instance, while 37.5% White and Asian-American students complete STEM degrees in five years, Black STEM degree completion is 22.1%, Latino 18.4% and Native American students 18.8%, (Hurtado et al., 2010). Improving URM student STEM-degree completion is critical because URM STEM students are more likely to be prepared to apply to medical school. Thus, persistence of URM STEM is critical because this is the pool of Latinx students that will pursue the field of medicine.

Additionally, the need for a diverse physician workforce has been emphasized by the Association of American Medical Colleges (AAMC), which includes over 115 medical schools in the United States. The latest, *Diversity in Medical Education: Facts & Figures* (AAMC, 2019), highlights the continued disparity of admissions trends of Black, Latinx and Native American students. Also, the AAMC has published two reports, *Altering the Course: Black Males in Medicine* (2015) and *Reshaping the Journey American Indians and Alaskan Natives in Medicine* (2018), highlighting the historical low admission trends of Black and Native student applicants. These reports were critical in centering discussions around diversity and recruitment efforts. However, the AAMC has not published a report on Latinx students and a need exists to understand Latinx premedical undergraduate experiences.

Furthermore, I provide a brief overview of Latinx students in medicine below for background on the current state of Latinx students in medicine. The number of Latinx student graduates from medical school remains low with only 5% of the graduates from medical school with Latinx backgrounds in 2018-2019 (AAMC, 2019). When we take a closer look at the admissions data, specifically at Latinx student data from the AAMC (2019), the Latinx premed applicant pool of students represents 6.2% of all the 52,757 medical school applicants in 2018-2019, see figure 1.1. The applicant pool has hardly changed in the past five-year admissions cycle, with Latinx, Black and Native American students with low applicant numbers, see figure 1. Also, medical school matriculation admissions trends are low for Black, Latinx and Native American students, see figure 1.2. Latinx students make up only 6% of matriculating students into a US medical school in 2018-2019 (AAMC, 2019). The admissions rate of Latinx matriculants has hardly changed in the past five year with only 1,000 Latinx students matriculating every year to medical school, see figure 1.3. The large pool of Latinx premed

applicants is a great representation of students that persisted towards medical school. Further examination is needed to understand the pool of Latinx premedical student applicants.

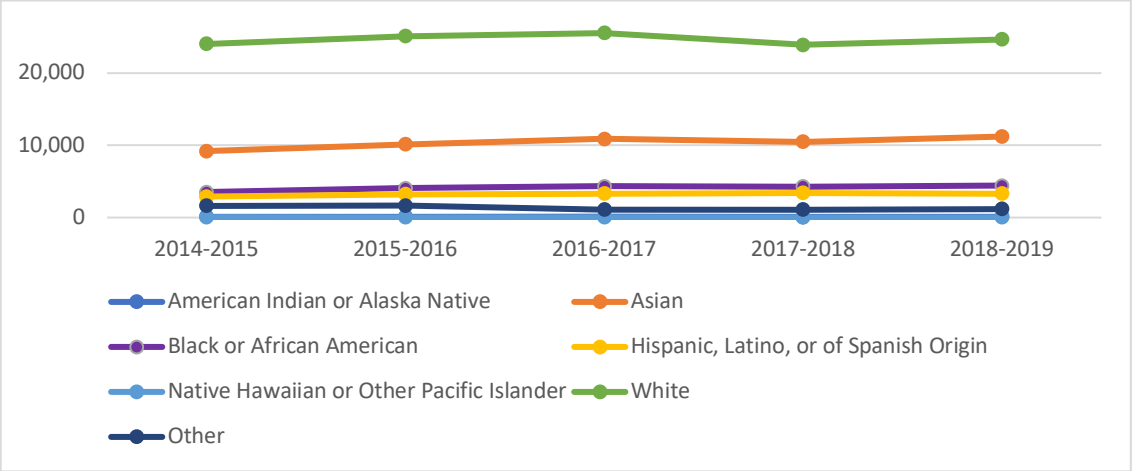

Figure 1.1: Medical School Applicants by Race & Ethnicity from 2014-2019
Source: Association of American Medical Colleges (2019). *Diversity in Medicine: Facts & Figures 2019.* Washington, DC.

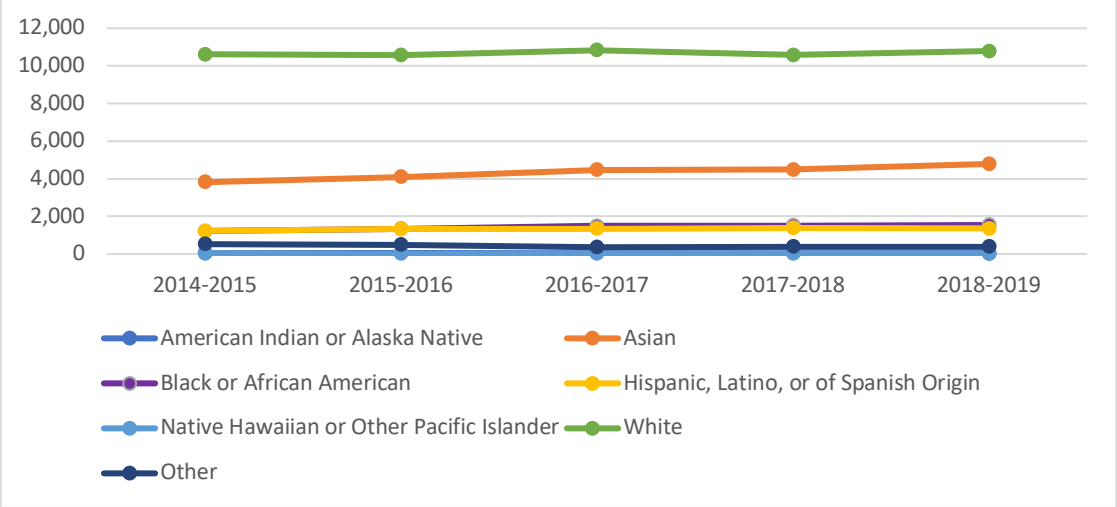

Figure 1.*2*: Medical School Matriculants by Race & Ethnicity from 2014-2019
Source: Association of American Medical Colleges (2019). *Diversity in Medicine: Facts & Figures 2019.* Washington, DC.

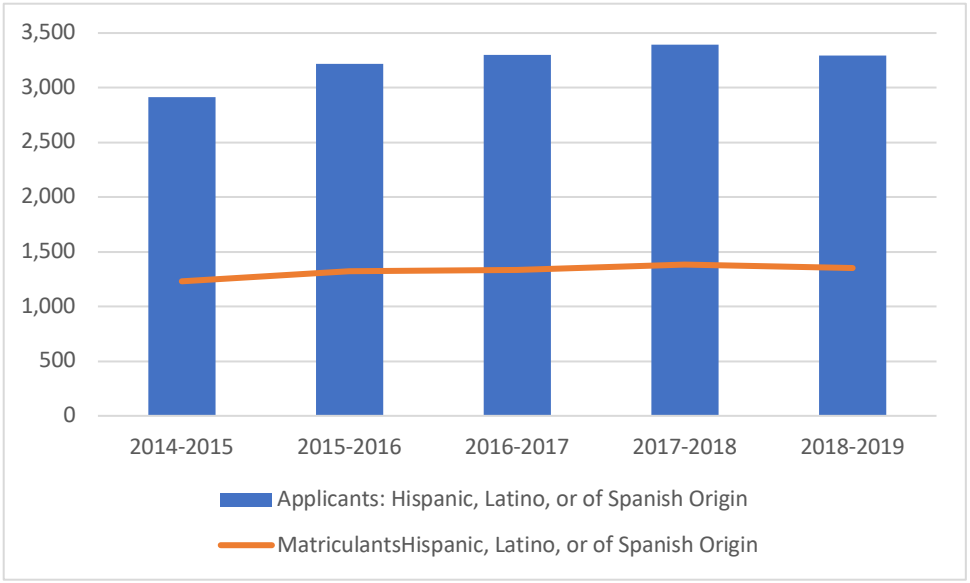

Figure 1.3: Latinx medical school applicants and matriculants from 2014-2019
Source: Association of American Medical Colleges (2019). *Diversity in Medicine: Facts & Figures 2019.* Washington, DC.

Additionally, California plays a critical role in preparing Latinx physicians. Of all the medical schools in the United States, Florida, California and Texas are the top three states that produce the most Latinx applicants to US medical schools and Latinx matriculants to enter US medical schools, (AAMC, 2019). California medical school applicants from underrepresented backgrounds have drastically reduced since the passing of Proposition 209 in 1996, which eliminated affirmative action and the use of race in admissions policies. The number of underrepresented medical student applicants from California decreased in the 1990s and the admissions of unrepresented students has also seen a decrease trend in California (Center for California Health Workforce Studies, 1999). These low numbers of admittance of underrepresented students is alarming given California changing demographics. From the latest Campaign for College Opportunity report in 2021, the State of Higher Education for Latinx Californians, Latinx youth make up 55% of the K-12 system of education. The Latinx youth population is growing at a rapid rate and the Latinx community is projected to become the

majority status of the United States by 2050 (Passel & Cohn, 2008). The current California population demographics are 39% of state residents are Latino, 36% are white, 15% are Asian or Pacific Islander, 6% are African American, fewer than 1% are Native American or Alaska Natives, and 3% are multiracial or other, according to the 2019 American Community Survey. However, California only has 6% Latinx physicians to serve the increasing Latinx population (Coffman, Calimlim & Fix, 2021), see figure 1.4. The UCLA Latino Policy & Politics Initiative (2018) published a report on the Latino physician shortage and stated that it will take 500 years for California to reach parity in the number of Latinx physicians to serve the growing California Latinx population. Thus, California plays a critical role in preparing Latinx undergraduate students in premed studies in order to serve the growing Latinx community and provide culturally competent care.

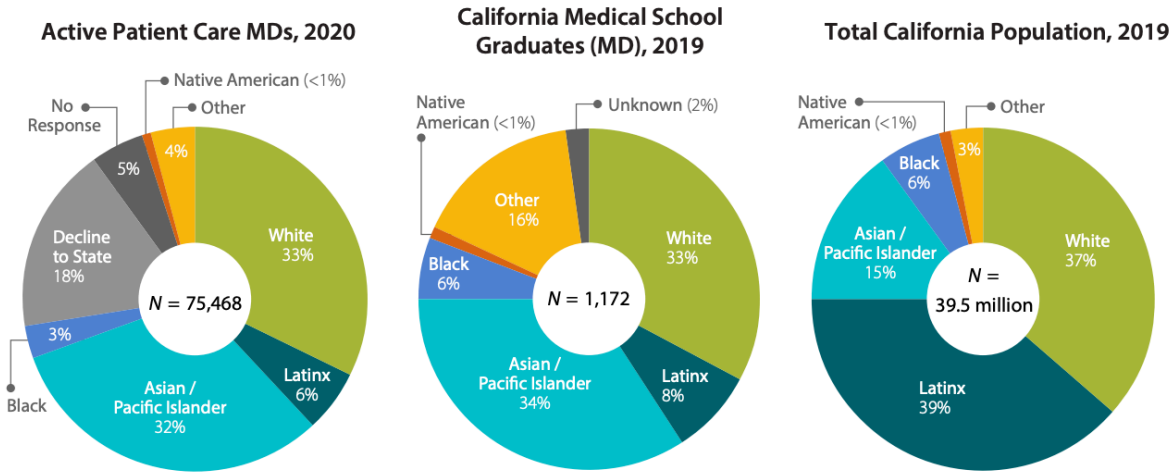

Figure 1.4: Race and Ethnicity of Medical School Graduates, Physicians and Population, California, 2019 and 2020
Source – California Health Care Foundation (2021*) California Physicians: A Portrait of Practice.*

Therefore, further attention is needed on the persistence of Latinx students in premed studies, in order for Latinx students to reach their medical dreams. To better understand persistence of Latinx premed students into medical school, I will examine the role of cultural assets on Latinx persistence in premed studies. I will begin by addressing the statement of the problem and then provide an overview of Latinx student persistence in higher education, an overview of URM STEM students in higher education and Latinx students in STEM and Medicine. Lastly, an overview of the three article dissertation will be provided with a brief description of each article.

Statement of the problem

In order to address the Latinx physician shortage, further research is needed on persistence and experiences of Latinx premed students during their undergraduate years. Previous research has shown that although Latinx students are entering college with high aspirations to pursue STEM fields, they graduate from STEM at a much lower rate than White and Asian students (Crisp et al., 2009; Hurtado et al., 2010). Additionally, according to California Health Care Foundation (2021), this past year 8% Latinx physicians graduated from medical schools in California, thus highlighting the need to understand how Latinx students are persisting during their critical undergraduate years. However, there is limited research on Latinx premedical students. This dissertation study addresses the dearth of studies on Latinx premed students by bridging Higher Education research, STEM research and centering on Latinx premedical students.

Secondly, prior STEM research has used deficit framing, by focusing on Latinx student attrition in the sciences. The vast majority of premed research has focused on Students of Color leaving premed studies due to their academics and solely focusing on academic measures of

success, such as GPA and graduation rates, (Alexander et al., 2009; Barr et al., 2008; Crisp et al., 2009). The field is lacking an examination of cultural assets, navigational strategies and ways of knowing of Latinx premed students that are pursuing and persisting in the field of medicine. There is a gap in addressing Latinx student persistence in the sciences through an asset-based framework that focuses on Latinx students' cultural strengths. This dissertation aims to examine the cultural assets and concepts of giving back to their community, social justice, familial and cultural assets that Latinx students bring to their academic pursuits of medicine.

Lastly, the vast STEM research uses traditional quantitative methods and large student data. The majority of STEM research studies are quantitative and multi-institutional studies, these are not able to capture granular campus impact on Latinx persistence in premed studies. STEM researchers have shown that institutional context matters and needs to be part of an analysis on student persistence (Xu, 2018). Thus, culturally-appropriate methodologies need to be used in STEM research to holistically understand Latinx student persistence within a racial campus climate.

Background

I. Overview of Latinx student persistence in higher education

Below is an overview of the main factors that impact Latinx student persistence in higher education. From early persistent theories, Tinto (1993) laid the groundwork on student persistence by identifying, academic and social integration, as two key factors in student persistence and retention in a university. However, the biggest criticism of Tinto's theory is that it makes assumptions that students' behaviors, such as, participating in tutoring sessions, will lead to their integration on campus. Thus, the seminal work of higher education researchers, (Hurtado & Carter, 1997; Gandara & Contreras, 2009; Yosso & Solórzano, 2006, Rendón, 2002;

Nora & Crisp, 2009) have centered race/ethnicity and contributed to the research literature of Latinx student persistence and retention in higher education.

Sense of belonging. Sense of belonging is a psychological sense of identification with a campus and identifying as a member of a campus (Hurtado & Carter, 1997). Sense of belonging impacts a student's engagement with their campus environment and has been found to contribute to students of color persistence in higher education (Hurtado & Carter, 1997; Hausmann, Schofield, & Woods, 2007; Strayhorn, 2012). Hurtado & Carter (1997) highlight the important role of faculty in creating a sense of belonging, such as, when faculty takes interest in students and creates meaningful relationships with them. Additionally, Musoba et. al., (2013) research on Latinx students attending an HSI, described their sense of belonging in parallel terms as belonging to their family. Musoba et. al., (2013) states, "visualizing the university community as a family provides a frame of reference where [students] knew how to belong and was congruent with their cultural values," (p. 362). Thus, feelings of sense of belonging, in a college environment is similar to feelings of being part of a family for Latinx students.

Campus Racial Climate. Campus climate is a complex psychological measure that captures students' perceptions of their environment (Hurtado & Carter, 1997). Some items that make up campus climate are validation, sense of belonging, cross-racial interaction and discrimination, (Hurtado & Carter, 1997, Hurtado et al., 2008). Inclusion of campus climate is pivotal for research on underrepresented students such as Latinx students because campus climate has been widely researched as impacting Latinx students' sense of belonging and persistence in higher education (Hurtado & Carter, 1997; Hurtado et al., 2008). Additionally, Yosso et al., (2009) highlights the negative campus environments that Latina's navigate while enduring multiple microaggressions.

Validation. Validation involves demonstrations of recognition, respect, and appreciation for students and their communities (Rendón, 1994). The positive impact of validation has been demonstrated for some less traditional student populations, including Latinx community college students (Barnett, 2011; Rendón, 2002). The role of institutional agents, such as faculty and staff, are key in providing validation to students, both academically and socially, (Rendón, 1994).

II. Overview of Underrepresented Students STEM students in higher education

URM STEM students are entering college with high aspirations to pursue STEM fields however, URM students are graduating in STEM at a much lower rate (Crisp et al., 2009; Koenig, 2009; Hurtado et al., 2010). Below I will review the main factors that impact URM STEM students.

High school academic preparation. The American Association for the Advancement of Science (2001) has stated that the most important factors contributing to STEM degree completion in the sciences are quality of high school curriculum, test scores, class rank and grade point average in high school. However, URM STEM students are more likely to attend low resource high schools, located in low-income communities (Estrada et al., 2016; Kuh et al., 2016). Thus, the quality of high school preparation must be understood through the context of access to resources in high school. The pivotal research by Elliott et al. (1996) highlights the role of high school academic preparation impacting persistence rates of Black and Brown students.

Individual factors. In addition to high school academic preparation, researchers have also explored the role of individual student factors such as motivation, aspirations, self-efficacy, career intention and science identity on persistence of Black and Latinx STEM students (Carlone & Johnson, 2007; Tyson, Borman & Hanson, 2007; Crisp, Nora & Taggart, 2009).

Challenges in Science courses. The seminal study by Seymour and Hewitt (1997) highlights the role of gatekeeper courses as points of departure for URM STEM students in the sciences. Science gatekeeper courses are rigorous entry level courses in Chemistry and Biology courses. Crisp et al., (2009) found that enrollment in Biology 1 courses had a negative impact on students' major, thus courses begin to take on a gatekeeper role, preventing URM students from continuing on in the STEM field. Additionally, Alexander et. al, (2009) and Barr et. al, (2008), have revealed the role of these gatekeeper courses for underrepresented premedical students.

Institutional Context. Institutional context represents the various types of campuses from 2 year to 4 year campuses. An institution's level of selectivity has been shown to impact URM students retention in STEM (Chang, Cerna, Han, & Saenz, 2008; Chang Sharkness, Hurtado & Newman, 2014). An example of positive impact of institutional context are Historically Black Colleges and Universities (HBCUs). HBCUs are important producers of Black faculty in STEM fields and producing Black STEM graduates, with HBCUs awarding 30% of STEM bachelor degrees to Black students (Perna, 2001 and Upton & Tanenbaum, 2014). Institutional context can also have a negative impact on student persistence. For instance, Black and Latinx STEM students that attend predominantly white institutions have low persistence rates in STEM fields during their first year (Chang et al., 2008). Also, recent STEM research has found that institutional factors are very important for STEM student academic and social integration, (Xu, 2016). Thus, institutional context is a very important concept that contributes to URM student persistence in the STEM fields.

III. Latinx students in STEM and Premed

There is minimal literature that focuses solely on Latinx students in the field of STEM and medicine. Most of the literature includes studies on Black and Latinx students in the

umbrella term of underrepresented students (URM) in STEM. Below are the main topics that focus on Latinx students in STEM and Latinx students in medicine.

Latinx students in STEM. Similar to the STEM literature, research on Latinx STEM students has focused on completion rates, student success and retention. Scholars such as Garcia & Hurtado (2011) have identified factors of persistence of Latinx STEM students in Hispanic Serving Institutions (HSIs) and non-HSIs. The results from this study reveal that an increased negative cross-racial interaction decreases the likelihood of persistence for Latinx STEM students (Garcia & Hurtado, 2011). The study Garcia & Hurtado (2011) of Latinx STEM students tested a conceptual model and the findings pointed to academic and social experiences as significant for predicting the likelihood of Latinx persistence in a STEM major. Also, Garcia & Hurtado (2011) locate an important indicator of Latinx persistence in STEM, joining a student organization.

Additionally, the latest research on Latinx STEM students has been inclusive of identity and culture of Latinx STEM students and used asset-based frameworks. For instance, Rendón et al. (2019) has contributed to our understanding of obstacles that Latinx STEM students experience in college by using asset-based framework to identify assets that are specific to Latinx STEM students which are: 1) giving back and 2) curiosity, 3) ganas/perseverance/resiliency and 4) navigational. These assets are unique in that they support Latinx students' pursuit of STEM. Using asset-based frameworks, Latinx STEM research has pointed towards the positive influence of Latinx parents in Latinx STEM persistence, (Rincón et al., 2020; Rodriguez & Blaney, 2020). Also, Rincón et al (2020), states that first-generation Latinx STEM students are engaged in community cultural wealth and resistance, as they navigate STEM and remain anchored in community during their studies. Furthermore, Rodriguez &

Blaney (2020), research on Latinas experiences in STEM, findings point that Latina's experience isolation and built sense of belonging by engaging in identity-based STEM organizations.

Latinx students in Premed. Minimal studies focus solely on Latinx students in medicine. The majority of reports focus on the "leaky pipeline" in medicine and focus on the low number of admission rates of underrepresented students in medicine (Barr, Gonzalez & Wanat, 2008). The report by Olivares-Urueta (2012), "The Latino/a Health Professions Pipeline: An Overview," provides insight to the barriers of Latinx students pursuing medicine from K-12 to undergraduate college. This report includes a literature review of main research that focuses on Latinx students in premed studies, review of admission policies and an overview of three outreach programs aimed at diversifying health professions. The report highlights institutional barriers, such as, lack of academic and social support for Latinx students in the sciences, both inside and outside of the classroom (Olivares-Urueta, 2012). Also, Olivares-Urueta (2012) reports on the critical role of student involvement in student organizations which provide both academic and social support to Latinx premed students.

Overview of the study

The goal of this study is to understand Latinx premed student persistence in the field of premed studies through a lens that views Latinx culture as an asset. This study examines how Latinx cultural assets promote retention and persistence of Latinx students in premed studies. The following research questions will guide the study:

R1) Are there unique cultural assets/*ventajas* and knowledge/*conocimientos* that Latinx premeds use in their pursuit of premed studies? How do these cultural assets/*ventajas* and knowledge/*conocimientos* contribute to persistence of Latinx students in premed studies?

R2) How does cultural assets/*ventajas* approach of giving back relate to the field of medicine?

This study is based on twenty four Latinx premed students from a large research university, located in Southern California, near the San Diego and Mexico border region, referred to as Sol University. Sol University's campus demographics for 2020-2021 are Black 3%, Latinx 20.8%, Asian 37.1%, White 19%, American Indian/Alaska Native .4% and Native Hawaiian/Pacific Islander .2%, Undeclared 2.5% and 17% International Citizen (Campus institutional research, 2021). The campus is an emerging Hispanic-Serving Institution (HSI) with 20% Latinx students. Sol University was chosen based on four criteria: research productivity classification, large science presence on campus, large Latinx premeds presence on campus and medical school on campus. IRB obtained through the campus IRB office.
The participants were recruited via direct emails, through campus resource centers and student organizations. Also, through researcher's professional experience working in a medical school, she reached out to students that met the criteria. The following is the selection criteria: students must identify as Latinx, Latino/a, Chicano/a, or Hispanic, students in their junior, senior year or recent college graduates from Sol University, must demonstrate an interest in applying to medical school within the next three years. A total of twenty-four participants agreed to the study, fourteen females and ten males, see appendix A. Each participant completed two pláticas with researcher. Data collection was conducted in the summer 2020 and due to the COVID-19 pandemic, pláticas were conducted online with a Zoom platform. Each participant filled out a consent form and received a $30 gift card for their participation.

This study uses a culturally-relevant methodology of pláticas that draws from Chicana feminist epistemology (Fierros & Delgado Bernal, 2016). I use the following theoretical

frameworks, Yosso's Community Cultural Wealth Model (2005) and Rendon et al. (2019) and Chicana/Latina Feminist Epistemology (Delgado Bernal, 1998) to ground my research in asset-based frameworks that acknowledges and centers Chicana and Latina scholar's ways of knowing and knowledge (Fierros & Delgado Bernal, 2016). Chicana Feminist Epistemology is a framework that includes the methods of pláticas as an extension of a particular way of knowing (Fierros & Delgado Bernal, 2016). The pláticas were semi-structured and two pláticas were conducted with each participant, (1 hour average). The pláticas were conducted from June 2020 – September 2020, during the height of the COVID 19 pandemic. Initially, pláticas were going to be conducted in person, but due to the pandemic, switched to virtual pláticas through the use of the Zoom platform. The first plática focused on relationship building between the researcher and participant, explanation of the project and learning about the participant's family and education background. The second plática focused on participants' experiences in premedical studies during their undergraduate years. As the plática is meant to create a space for vulnerability, I shared my experiences and struggles as a first-generation student in Sol University. The pláticas also allowed the Latinx students to share unexplored topics that are important in their college trajectory. Additionally, I employed the notion of 'cultural intuition,' that is when a Latina researcher brings their professional and personal experience into the research process and analysis (Bernal, 1998).

Positionality

My identity as a first-generation college student from a low-income family background has shaped my educational beliefs. I have dedicated my professional career to support students of color access and retention in higher education. Also, I am an alumna of Sol University and professional staff member of the medical school located in Sol University. I report my

positionality because my identity and experiences impact my research design approach, frame the study, analytical techniques and report findings. I use the concept of 'cultural intuition' by Delgado Bernal (1998) that recognizes the Chicana/Latina scholars bring with them their personal and professional experiences as a strength to the research process. I bring with me my professional experience of working with Latinx premed students for over 10 years from high school to medical school. Through this time, I have gained insight to the obstacles that Latinx premed experience as they pursue medical school. Also, reciprocity is centered in my research engagement with the student participants. As a Latina conducting research with Latinx students, I aim to have 'buena voluntad' which means I care about the well-being of the participants/community from this research. I acted in reciprocity and engaged with one of the participants and three non-participants in a new project to give back after I was done with all the pláticas. The project was a Latinx Premed Guide for future generations of Latinx students at Sol University to provide premedical information as students navigate during their undergraduate years. Lastly, because of my close affinity to the campus, theoretical frameworks will guide my study and experts will be consulted along the way to reduce any potential bias.

Organization of Dissertation

The goal of this dissertation is to examine the cultural assets of Latinx students as they persist in their undergraduate years in premed studies. In each of the chapters that follow, I draw on data from twenty-four Latinx premedical students in an R1 and emerging Hispanic-Serving Institution. I use asset based frameworks and pláticas methodology to understand the role of culture in the lived experiences of the Latinx students as they are studying in premedical studies. Each participant completed two pláticas (one hour each). The first plática focused on relationship building between the researcher and participant, explanation of the project and learning about the

participant's family and education background. The second plática focused on participant's experiences of their pursuit of premedical studies within their campus context with a focus on their cultural assets they employed during their undergraduate years. Additional observations of the Latinx Premed Initiative, sessions and meetings were conducted and essay review. Since I was a facilitator for this new initiative, I had a double role, as researcher and facilitator. Due to my double role, I relied on my notes during the session and journaling after each session to capture key discussion and items that related to Latinx student persistence. Below is a brief overview of the three-articles and conclusion.

Chapter 2 explores epistemological orientations and use of a culturally relevant methodology in conducting Latinx STEM research and is intended for publication in a qualitative methods journal. Chicana/Latina Feminist Epistemology guides this section and challenges traditional notions of conducting research in diverse settings. An overview of pláticas methodology is provided and I examine the notions of pláticas as a healing space from the racial micro-aggressions in the STEM environment and explore reciprocity with Latinx STEM students. This chapter aims to inform the use of culturally-relevant methodology, pláticas to study Latinx STEM students.

Chapter 3 examines the impact of COVID-19 pandemic on Latinx Student persistence in their medical school pursuits and how Latinx students used cultural assets to persist during COVID-19. Using frameworks by Yosso (2005) and Rendon et al., (2019), I examine the use of two cultural assets, 1) navigational asset and 2) resistance asset. This article is very timely as this dissertation occurred during the height of the COVID-19 and all student participants are aspiring to enter the health professions. The targeted journal is Journal on Latinos and Education to highlight the experiences of the Latinx premed students during the COVID-19 pandemic.

Findings demonstrate, Latinx students are delaying their medical school applications, are managing multiple stressors and are navigating the online shift of clinical and volunteer experiences to the virtual space. Findings also highlight the important role of COVID-19 impacting the Latinx student motivations to address Latinx health disparities. Findings suggest Latinx students persisted in the face of a global pandemic and made connections to the larger structural issues that impact Latinx health outcomes.

Chapter 4 examines the cultural asset of giving back and its relationship to the field of medicine and is intended to be published in a higher education journal that centers on diversity, equity, and inclusion. The framework of Herrera & Kovats Sanchez (2022) that center families and communities for STEM Latinx students, along with the concepts of 'giving back' from Rendon et al. (2019) are used to examine how Latinx students are making sense of their future careers and examines the notion of 'giving back' to the Latinx community. Findings point towards Latinx students engaging in 'giving back' through various acts of service and resistance. Latinx students are bridging their cultural assets and their career aspirations in medicine.

Chapter 5 is conclusion and synthesizes findings across articles and provides implications for future research, practice and policy.

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CHAPTER 2

Centering Latinx students in STEM education research through pláticas methodology

Abstract

Pláticas methodology is introduced in this paper to advance the centering of Latinx researchers and Latinx students in STEM research. As an increase in Latinx educational researchers enter academia, engaging an appropriate epistemology and methodology that is culturally relevant and race-centered is key in the ongoing STEM education research which aims to diversify and create equitable outcomes for Students of Color. An overview of pláticas methodology and Chicana/Latina Feminist Epistemology is included, along with a discussion on the strengths, challenges and opportunities that pláticas methodology offers to STEM education researchers interested in working with Latinx students. This paper is timely as the Latinx student population and Hispanic-Serving Institutions are growing in higher education. This paper places an emphasis on reframing methodology to provide a culturally relevant and holistic methodology to engage Latinx Students and advance STEM education research focusing on Latinx students.

Keywords: STEM education, Latinx students, qualitative, pláticas methodology

Introduction

Addressing Latinx[1] student underrepresentation in STEM is a national priority to meet the STEM workforce goals and to achieve equity in order to reflect national demographics (NSF, 2020). According to the National Science Board's Science and Engineering (S&E) Indicators 2020 report, Latinx comprised 20.4% of the U.S. population (ages 20–34), yet represented only 14.8% of bachelor's, 11.2% of master's, and 7.8% of doctoral degree recipients in Science & Engineering fields (Trapani & Hale, 2019). In order to ensure that STEM education continues to advance and reach parity, there is a need to focus on Latinx students in STEM and the growing universities that are classified as Hispanic-Serving Institutions (HSIs). HSIs are two-year and

four-year campuses with 25% Latinx student population. Also, there is a growing emerging-HSIs campuses with 20-25% Latinx students in 2022 (Excellencia, 2022). HSIs are important because they respond to the changing demographics and serve 66% of the nationally enrolled Latinx students in higher education. Additionally, research shows that HSIs are key in Latinx student pathways to STEM (Herrera, 2020; Herrera et al. 2018; Herrera & Hurtado, 2014). As STEM research advances towards educational and racial equity in academic and social outcomes, a continuation to focus on the growing Latinx student community must continue to be in the center of STEM education research. Given the growth in Latinx student population, we must reimagine STEM research methodology to challenge traditional ways of data collection in order to shift to a culturally-relevant and holistic methodology to explore the experiences of Latinx students pursuing STEM. A shift is needed, which recognizes Latinx students from the margins and their experiences with racism and microaggressions in the STEM learning environment.

Moreover, the field of STEM education has experienced tremendous growth and a shift in adopting an asset-based approach in understanding the experiences of Students of Color in STEM. This is a shift that stems from Feminist Scholars of Color that center race, racism, gender and marginalization of Students of Color (Anzaldúa, 1987, hooks 1989, Delgado Bernal, 1998). Additionally, Chicana Feminist Scholars are bridging theories to advance methodologies in understanding Latinx student experiences in higher education (Flores Carmona, Hamzeh, Delgado Bernal & Hassan Zareer, 2021). These contributions are critical and must be understood and bridged to STEM education to go beyond addressing racial disparities in STEM education and to fully understand Latinx student experiences in STEM.

As a rising STEM education researcher, I was frustrated with the traditional qualitative methods offerings in my qualitative courses because the methods did not align with my cultural

motivations to pursue educational research; to support and empower Latinx students in higher education. I then was introduced to Chicana/Latina Feminist Epistemology (Delgado Bernal, 1998) and pláticas methodology as a method to center Latinx student experiences in educational research and empower participants through healing. Many diverse scholars such as Rendón et al. (2019), Hurtado et al., (2009), and others have begun challenging traditional notions of measures of success and centering experiences and voices of Students of Color in STEM research. Through this paper, I provide an approach to center Latinx STEM students from a Latina educational researcher who hopes to take up space in academia to interrupt the centering of white scholars and traditional ways of conducting qualitative, eurocentric and educational research.

Moreover, a methodological approach has key underpinnings to theoretical and philosophical assumptions of student success in STEM. Although there is a current shift to examine contextual factors of Students of Color in retention and persistence in STEM, many national organizations like National Science Foundation and National Academy of Science and Medicine continue to focus on academic outcomes in many of their national agendas. STEM research needs to go beyond academic measures in order to address the historical inequality of high school resources for Communities of Color which has led to the accumulation of educational debt in higher education (Ladson-Billings, 2006). The latest literature review on STEM education research trends reflects the continued reliance on quantitative studies and focus on epistemology and culture lagging behind topics such as policy, curriculum and evaluation (Li et al., 2020). To achieve a disruption of solely quantitative measures, new tools and methodological approaches must be used to reframe deficit views of Latinx students to asset-based and center Latinx student experiences.

Thus, a culturally relevant methodology must be used to examine experiences of Latinx students and to further understanding of racism and microaggressions in STEM classrooms for STEM educational equity. In this article, I describe pláticas methodology, a culturally relevant methodological approach, that centers Latinx student voices, experiences and engages Latinx students as knowledge holders (Fierros & Delgado Bernal, 2016). This paper draws from my dissertation research where I employed pláticas methodology with 24, Latinx first-generation college STEM students pursuing the field of medicine in a highly selective four-year institution. The pláticas were one hour long and conducted via zoom. Two pláticas were completed with each participant, for a total of 48 pláticas. The paper will include a discussion on epistemology, a literature review of critical feminist methodologies in STEM education and overview of how I applied pláticas methodology with Latinx STEM students. The aim of this paper is to review strengths, challenges and potential of using pláticas methodology with Latinx students in STEM to advance educational equity in STEM fields.

Epistemological orientation

Ladson-Billings (2000) explains that epistemology is more than knowing, it is defined as a 'system of knowing,' which is based on people's lived experiences and views of the world. Epistemology is very powerful because it shapes the lens that a researcher views the world and impacts how research questions are formed and the methodology employed in research. The STEM education field epistemology still heavily relies on postpotivism to find a single truth, a black and white interpretation of knowledge. Postpotivism assumes objectivity and uses scientific method to when seeking truth, for instance, STEM research largely draws from traditional forms of scientific inquiry for seeking knowledge and conducting research. Postpotivism also views participants as objects of inquiry and lacks understanding social context

and lived experiences (Pearson et al., 2022). The STEM education epistemology has historical roots in excluding diverse knowledge and viewpoints and results in epistemological racism that has center white male scientists (Delgado Bernal, 1998). However, as addressing equity in STEM education becomes a nationwide priority, STEM education epistemologies must be critiqued and new epistemologies must be adopted, especially as new researchers of color enter the STEM education field.

In my work, I am using a critical-race-gendered epistemology, in contrast to the traditional epistemologies that center white dominant narratives. Delgado Bernal (2002) has contributed to the development of critical-race-gendered epistemology into a Chicana/Latina Feminist Epistemology in education, which centers the knowledge and experiences of Chicana students in US Society. Chicana/Latina Feminist Epistemology, acknowledges and centers Chicana and Latina scholars way of knowing and knowledge (Fierros & Delgado Bernal, 2016). Central to Chicana/Latina Feminist Epistemology is recognizing the everyday lives of the researchers and participants, which challenges traditional notions of objectivity (Delgado Bernal, 1998).

In addition, through a critical-race-gendered epistemology, students are viewed as holders and creators of knowledge (Delgado Bernal, 2002). Through this epistemology, student knowledge impacts methods used to understand the lived experiences of students. Delgado Bernal further explains that employing a Chicana/Latina Feminist Epistemology in educational research becomes a means to resist epistemological racism and to recover untold histories, (Delgado Bernal, 1998). Qualitative methods which center the voices of the participants are taken further in a critical-race-gendered epistemology which recognizes that students from marginalized groups have often been silenced and not validated. Examples of critical-race-

gendered methodologies are story-telling, the centering of student narratives, counterstories, testimonios, *cuentos* and *dichos*. These methods go beyond the dominant narratives to capture stories that are traditionally missing. Pláticas methodology stems from Chicana/Latina Feminist Epistemologies, which I introduce and anchor in this paper to challenge the traditional science objectivity and bias that centers white norms and re-center Chicana/Latina research scholars and Latinx STEM students.

Literature Review

To situate pláticas methodology within STEM education research, I present a brief literature review on qualitative methodological tools in STEM education and qualitative studies that focuses on Latinx students in STEM education. Qualitative studies in STEM education use a variety of methodological tools, such as, case studies, focus groups, interviews and narratives. These qualitative tools have been applied in STEM education with the intention of incorporating diverse student voices and to understand the Student of Color college experiences in STEM. For instance, the phenomenology study by McGee and Bentley (2017) use life-stories interviews to uncover the marginalization of Black and Latinx students and their STEM aspirations which are grounded in helping others. The life-story interview format included semi-structure and open-ended questions on student's experiences in their home, school, neighborhood, and STEM classroom contexts. Burt (2020) used a similar qualitative narrative method of one narrative of an engineering Black male graduate student to examine the individual experiences of a graduate Student of Color and their career processes as they plan to enter academia as a faculty. Burt (2020) and his participant employed an elaborate storytelling technique in sharing the critical role of institutional change agents in his development of his engineering identity. Another qualitative tool that has been used is ethnography by Allen & Eisenhart (2017) with four women

of color in STEM to examine new high school STEM initiatives and identity development. The study is a three-year ethnographic study and included various individual interviews during the years and additional interviews with parents and teachers. Additionally, Nasir & Vakil (2017), also conducted an ethnographic study to examine STEM-focused academies in urban schools, highlighting student's identities in STEM. Furthermore, focus groups is another tool that has been used, such as, Gibbs & Griffin (2013), qualitative study uses focus groups with diverse graduate students to examine a student's career choice. Multiple focus groups were conducted with a semi-structure questions and a focus on consistent questions per focus group. While Palmer, Maramba & Dancy (2011) conduct in-depth interviews as a qualitative tool to examine retention of students of color in STEM in predominantly white institutions. Palmer et al., (2011) also used member's check by providing transcript to participants and provided 'thick description' of participant's reality. Lastly, case study methodology has also been applied by Museus & Liverman (2010) with the selection of three high performing institutions. The case study tools allowed for a holistic understanding of successful institutions and campus climate issues. Collectively, the qualitative studies have moved the STEM education field in embracing race, identity and recognizing the critical role of campus context in the STEM learning environment.

Furthermore, the latest qualitative research on Latinx STEM students centers Latinx students through the use of phenomenological theories and asset-based frameworks. Phenomenological theories aim to understand the participant and their world, while asset-based theories challenges traditional deficit views of students and focus on cultural assets and strengths of students. For instance, Rincón, Fernandez, & Hinojosa (2020) used a phenomenology methodology to center the lived experiences of Latinx STEM students, through interviews. Some of the unique characteristics of phenomenological analysis are the requirement of the researcher

to disclose their positionality in relation to the phenomenon being explored, values experiences, use verbatim excerpts and quotes from participants (Padilla-Diaz, 2015). Findings from Rincón et al., (2020) reveal a grounding of community for Latinx students as they navigate STEM. Additionally, Rodriguez & Blaney (2020) conducted a phenomenology study, focusing on Latina STEM student's sense of belonging. The qualitative tools used were interviews and phenomenological analysis that included the researcher's setting aside their own beliefs and assumptions about the phenomena. Rodriguez & Blaney (2020) point to the critical role of student organizations for Latina STEM students experiencing marginalization due to the STEM learning environment. Herrera and Kovats Sánchez (2022) conducted a qualitative study on community-based perspectives by Latinx students in STEM. The qualitative tools used were focus groups and follow-up one-on-one interviews with a small subset of Latinx students. This study had a large research team and researchers used the focus group to build rapport with Latinx students to discuss experiences in STEM. The findings of Herrera and Kovats Sánchez (2022) point towards the critical role of community and a new STEM identity model that grounds community for Latinx student identity and persistence in STEM. Furthermore, López, Basile, Landa-Posas, Ortega, & Ramirez (2019) guided by Chicana/Latina Feminist Epistemology, uses pláticas within the research team to share positionalities, experiences with STEM and familismo. Through these pláticas, the research team decided to focus on familismo and conduct a mixed-methods study, with a leading qualitative strand that included interviews with Latinx STEM students. López et al. (2019) identified familismo or the strong identification of family as a cultural practice enacted by Latinx undergraduates in Science and Engineering. Moreover, these qualitative studies offer insight to the role of identity, culture, family and communities of Latinx STEM students and employ asset-based frameworks to challenge traditional deficit narratives of

Latinx students lagging in STEM. A gap in the literature is the use minimal use of Chicana/Latina Feminist Epistemology and employing pláticas as a methodological tool in data collection. Thus, the STEM education field has been gradually shifting to be more inclusive of qualitative tools and I now present a novel qualitative methodology to continue advancing STEM education research to engage Latinx students.

Overview of pláticas methodology

Pláticas are a methodological approach that draws from Chicana/Latina Feminist Epistemology (Fierros & Delgado Bernal, 2016). Chicana/Latina Feminist Epistemology acknowledges and centers Chicana and Latina scholars' ways of knowing and knowledge (Fierros & Delgado Bernal, 2016). Chicana/Latina Feminist Epistemology is a framework that includes the methodology of pláticas as an extension of a particular way of knowing (Fierros & Delgado Bernal, 2016). Early researchers, Valle & Mendoza (1978) have contributed to the articulation of pláticas as an inquiry approach that includes *entrada*/entry, interview and *despedida*/goodbye and appreciation. Chicana/Latina scholars using Chicana/Latina Feminist Epistemology contributed to pláticas as a methodology that is grounded in *respeto*/respect for the participants as holders and creators of knowledge (Delgado Bernal, 2002), makes every day lived experiences as part of the research inquiry (Fierros & Delgado Bernal, 2016), a potential space for healing (Avila, 1999) and relies on a relationship that is based on reciprocity, vulnerability, and researcher reflexivity (Avila, 1999). Fierros & Delgado Bernal (2016) have identified the following five key principles for pláticas methodology:

1) View and honor participants as co-constructors of knowledge;
2) Incorporate everyday lived experiences as part of research inquiry;

3) Are two-directional and based on reciprocity, vulnerability, and researcher reflexivity;
4) Provide a potential space for healing;
5) Draw heavily from Chicana/Latina feminist theory.

Pláticas were chosen over traditional methods because pláticas respect participants as knowledge holders and draws from the everyday lives of Latinx students. Pláticas have been used by various researchers in educational research with Latinx youth and Latina mothers (Gonzalez & Portillos, 2012; Guzmán, 2013). Few STEM education scholars have applied pláticas methodology (López et al., 2019) with Latinx research teams and Latinx students. The application of pláticas in STEM education research is a disruption in traditional methodology that centers traditional measures of academic outcomes and student success in STEM education. Continuing to center race and racism in STEM education, pláticas methodology furthers the centering of Latinx students, especially as Latinx students population and increase of Hispanic-Serving Institutions. Pláticas methodology also disrupts the traditional qualitative approach which traditionally occurs as a one-way interaction and lacks the recognition of the power dynamics between the researcher and participant. In a one-way interaction, participants are viewed as the subject and the interviewers extract information from the participant. The researchers hold the power between the researcher and the participant. These types of interactions may be harmful and further the marginalization of Latinx students in higher education. To center Latinx students and address these important qualitative issues, I choose to engage in pláticas methodology with twenty four Latinx STEM students. Below I provide the strengths of pláticas methodology and examine how each principle of pláticas methodology

challenges traditional qualitative methodology and how each principle further STEM education research when engaging with Latinx students in STEM.

Strengths of pláticas methodology

Pláticas methodology offers researchers a variety of strengths in STEM education research. Below is an overview of the various strengths from employing pláticas methodology in STEM research with Latinx students, from building a relationship with participants to a potential place of healing. I examine the five principles of pláticas methodology and the challenges that can arise. Lastly, I offer suggestions on expanding engagement with Latinx students in STEM.

View and honor participants as co-constructors of knowledge

Central to pláticas is to honor participants as co-constructors of knowledge and this principle allows recognition of students as knowledge holders. To view Latinx students as knowledge holders requires a transformative shift for researchers in STEM education research, which have traditionally viewed Latinx students as underachieving with low academic outcomes compared to White and Asian students. An epistemological shift is needed which traditionally centers white student narratives as norms. Through Delgado Bernal's (2002) critical-race-gendered epistemology of Chicana/Latina Feminist Epistemology, students are viewed as holders and creators of knowledge. Chicana/Latina Feminist Epistemology acknowledges and centers Chicana and Latina scholars' ways of knowing and knowledge (Fierros & Delgado Bernal, 2016). Pláticas methodology extends Chicana/Latina Feminist Epistemology in recognizing students as knowledge holders by recognizing their familial and household knowledge, bilingualism, biculturalism and commitment to their communities. Below is an example of recognizing students as knowledge holders through pláticas methodology. During my plática

with Janet[2], a Biology major, I told her that I value her knowledge as a STEM student and that she is an expert on STEM experiences. I asked Janet,

> **Author**: what have we not talked about that is important to you?
> **Janet**: we need to talk about racism with faculty.

Janet then proceeded to share a racial microaggression in the STEM classroom with her professor. The plática that I had with Janet allowed us to not follow a strict protocol, but instead the plática allowed for the participant to share items that were important to her and her experiences as a STEM student. By allowing the participants to share items important to them, the pláticas moved beyond surface answers to questions but went further in-depth about their experiences on their campus as a STEM student. If I had not recognized Janet's knowledge as a STEM scholar, I would have missed this topic of racism and microaggressions. Although I come from a similar Latinx background as Janet, as the researcher, I do not know the lived experiences of Janet within the STEM environment. Issues of campus context, racial campus climate, racial faculty makeup and sense of belonging within the student's science department are all issues that arose from the Latinx students guiding the pláticas. Thus, pláticas allow an in-depth analysis of Latinx student experiences, including topics such as racism and microaggressions inside the STEM classroom.

Another strength of pláticas methodology is the fluidity involved in a plática which is a mechanism to honor Latinx students as knowledge holders. A traditional interview protocol is not needed, as the researcher does not check off a list of questions but instead engages in a conversation with participants. Instead of an interview protocol, a pláticas protocol includes areas of discussion during the plática. A plática allows for a two-way conversation that makes space for participants to discuss items that are important to them (Delgado Bernal, 2002). Below is a sample from my first pláticas with Luis. Luis is a Human Biology major that recently

graduated from college, he experienced translating for his father when he was younger. Luis plans to use his Spanish skills in his future practice and sees a role for himself in alleviating language barriers.

> **Luis**: I don't know if you understand me… like, that type of breaking, that communication barrier between, people from the Hispanic population and people that come from Mexico…
> **Author:** Yeah…like there could be some miscommunication
> **Luis**: and also…
> **Author**: Go ahead.
> **Luis**: Sorry, sorry, sorry. Also like in the Mexican population, I feel like there's this stigma where people don't want to go to the doctor or they're afraid to go to the doctor. I just want to break that communication barrier and like, not make people like, I don't know how to put it. Sorry. I want to explain myself good…

During this pláticas, Luis and I went back and forth regarding his interest in speaking Spanish as a physician in the future. Other participants had mentioned using their bilingual skills and I thought that's what Luis was planning to do. However, the back and forth that occurred centered on Luis and his view of the importance of addressing both language and stigma in medicine for the Mexican community. In these interactions, there are power dynamics present, as I am the researcher, asking questions on my research project. Also, through my professional staff role, I had worked with Luis in a premed program, so Luis had some level of comfort with me. However, as the researcher, I still held power and through the back and forth, the power went back to Luis. Luis was able to insert himself and clarify the concept of breaking. During our second pláticas, we discussed this interaction. Luis shared that when I asked a question, sometimes he didn't know what to say, but pláticando (conversing) was helpful for him "it makes me like reflect and see."

Incorporate everyday lived experiences as part of research inquiry

Another unique aspect of pláticas methodology is the inclusion of student's everyday lived experience as part of the research inquiry. In traditional research methods, research

questions are central to the items being investigated. In pláticas methodology, through the fluidity and back and forth of the conversation, there is space to go beyond responses to research questions. As a graduate student, this was difficult to balance, as I wanted to focus on my dissertation questions, but I also wanted to engage meaningfully with the Latinx students. To achieve meaningful pláticas with the Latinx students, I conducted two rounds of pláticas, each one hour long. The extra time allowed for back and forth and inclusion of everyday lived experiences of Latinx students.

To incorporate the everyday lived experiences of Latinx students, I made space and time to discuss 'going off topic.' While conducting the pláticas, the students and I realized we were going off topic. We both made time and listened to each other. The items students shared while 'going off topic' were important to the students. Journaling after the pláticas helped me reflect on the 'going off topic' moments. I then began to notice, when students said they were 'going off topic', they were providing a longer narrative and providing more context to their responses. My interpretation of these 'going off topic' moments was that the topic of persistence in STEM and the lived experiences of Latinx students are complex. The complex lived experiences and responses were not brief and required contextualizing within the lived experiences. The pláticas through the back and forth and focusing on the lived experiences allowed for the layers and complexity to be revealed. For instance, on the topic of persistence in STEM, the family layers were discussed, familial, financial and campus context.

Also, the pláticas were conducted during the height of the COVID-19 pandemic with a virtual zoom platform. The following items were discussed, that were not part of my original research topics; the transitions to virtual learning environment, moving back home, lack of employment, anti-police brutality nationwide protests and the impact of COVID-19 pandemic on

the lives of the Latinx students. All these items were important to the students, especially the nationwide anti-police protests and COVID-19 pandemic. I could not ignore these national events and we had discussions on the latest current events. I started many of my pláticas with recognizing the key moments and acknowledging that a lot is happening in the world right now. Below is an excerpt of my pláticas with Diana, a Latina, Mexican-American, majoring in Human Biology and Global health. Diana shared what she was witnessing in her neighborhood with COVID-19.

> **Diana**: When Covid came out, a lot of testing was in these higher income areas. And so I know just based on what I see and the things that I read, like they have a lot more resources. So I want to go where the help is needed. And so definitely want to stay in LA county. I've had a lot of family from East LA, South Central and so I'm always taking the metro over to LA.

Through pláticas fluidity and focus on the lived experiences of Diana, pláticas allowed the inclusion of Diana's lived experiences with her family in her local neighborhood. Diana kept returning to discuss her hometown and her hometown clinics. Through the pláticas, led towards the findings of the impact of COVID-19 and Diana's understanding of the current pandemic and the social determinants of health, such as access in low-income communities (Garcia, 2022). Diana continued to share that she hopes to contribute to her community to address health inequities in the Latinx communities.

Provide a potential space for healing

Pláticas is a potential place of healing for student participants. The STEM learning environment is known as a competitive space, which places heavy emphasis on academic metrics, such as exam scores and grade point average (Seymour & Hewitt, 1997; Hurtado et al., 2009). The STEM competitive space can come to odds with Latinx student's culture and identity which places emphasis on collaboration, culture and family (Villalpando, 2003; Leudke, 2019).

Pláticas allow for validation and affirming students experiences, challenges and dreams and creates a potential space for students to pause, reflect and heal on their STEM trajectory.

The pláticas that I conducted with a subgroup of STEM students interested in pursuing medicine, all experienced constant reminders of needing to meet a threshold of grade point average and exam scores. Students received reminders about their grades through their fellow classmates, faculty and graduate and professional school admissions offices. For instance, as I was wrapping up the pláticas session with undergraduate Sergio, he begins to open up about the impact of grades and pressure in STEM on himself and his friends.

> **Author:** I just want to open up some time to ask you if this is there anything else that you would like to share about being a pre-med at Sol University
> **Sergio:** yeah, I think another stressful thing is, I recently saw an article about why underrepresented students should consider going to medical school and that's because of the wake sadly the death of George Floyd and the fact that we really need to change the systemic racism that has been occurring throughout our generation. But while the intent is good, to promote medical school pursuits and education for underrepresented students, I also think the article needs to explain how difficult [it is] being a pre-med students and how instead we should really fix the medical school admissions. I've noticed I had a bunch of friends who also are underrepresented who were pre-med student at first but then after taking a chemistry class they stopped. They stopped because they're like I can't take it anymore this class is too hard and I have to take more classes mostly science classes and I feel like I'm wasting my time or I feel like there was no hope for me to even become a doctor. I realized that the part of the problem is not just the difficulty of the requirement for medical school admissions but also the system in itself. Like why is it that there is so low percentage of underrepresented students in medical school? I do think that this is very important and that there are many passionate students out there who realize that medical school isn't for them but in reality it could have been, but they decided not to pursue it because of this imposter syndrome that sadly affects us all.
> **Author:** Thank you for sharing all of that. I agree with you 100% that there's definitely some structural issues that are happening and you bring up a really great point again about looking at the admissions perspective and I know you mentioned this earlier about the mission and who does the medical school want…

Also, through pláticas, I was able to validate students beyond their GPA. I reminded students that I did not see them as a number and that a certain course grade did not define them

and their career trajectory in the sciences and medicine. As an educator I believe in a humanistic approach that humanizes Latinx students and does not measure a student's worth by their academic scores. During the pláticas the Latinx STEM students had a physical release with tears and relief to be seen as a STEM scholar, not as a struggling STEM student. Rendón's (2002) work on validation theory for Latinx students, highlights the important role validation plays in supporting Latinx students that are first-generation college students and in college environments that do not support them.

Additionally, pláticas were a space for the STEM students to pause and reflect on their experiences in the STEM learning environment. The STEM students had a full load of STEM coursework, lab, employment, research and involvement in various student organizations. Their full load did not allow them to pause and reflect on their interactions with peers and faculty in the STEM learning environment. This pausing and reflection allowed the students to process many experiences for the first time. The Latinx STEM students were processing for the first time their experiences of social isolation, microaggressions, micro-insults and their negative interactions with peers and faculty, who questioned their intelligence. Unpacking these microaggressions is key for the healing of Latinx STEM students. Many of the students were never given space and time to name the institutional and structural issues occurring on their campus. For example, naming the structural issues of lack of Latinx faculty in the sciences and the role of high stake testing in STEM and admissions to medical school. Addressing these issues was key for student healing because of the strong notions of meritocracy within science and higher education.

> **Diana:** I just want to say thank you for having this space, it's like a venting time, I know I talk to a few of my friends who met with you as well and I just thank you for having this [space] allowing me to be heard and listen to. Because I never

> really spoken about these topics to someone other than friends that were complaining about process or the struggle, so thank you for that.
> **Author:** Thank you, [I] am glad it was helpful to….I think there[s] a lot, student carry being student at Sol University, being first-generation, being a Latina, so I'm glad you were able to share and get something off your chest. I also just want to let you know, I'm here also as a resource for you. I work at the medical school, if you ever want to check-in again during your final year or as you're getting ready to apply to medical school, we do have a new program that we just launched last year, the program will be opening up the applications in the fall.

Diana did apply to the outreach program in the medical school and today is in her final year of undergraduate studies and will be applying to medical school the following year. Thus, through trust and creating a safe space during the pláticas, a mutual space of healing is created for Latinx students that have been marginalized in STEM. This is a place where students can process their feelings and experiences, share their various identities, share their grades, without judgment and challenges and feel validated from the STEM learning environment which has tried to invalidate Latinx STEM student's culture, voice, and familial experiences.

Draw heavily from Chicana/Latina feminist theory

Pláticas methodology is rooted in of Chicana/Latina Feminist Epistemology (Delgado Bernal, 1998) and a strength is that the researcher brings their whole self into the research process. Part of Chicana/Latina Feminist Epistemology (Delgado Bernal, 1998), is the notion of 'cultural intuition,' which is the researcher bringing their professional, personal, familial and collective experience into the research process and analysis. Within engineering education research, there has been a call for inclusion of positionality statements in journals for transparency and recognizing researcher's privilege, especially with STEM equity research (Hampton, Reeping & Ozkan, 2021; Secules et al., 2021). The use of 'cultural intuition' goes beyond reporting a positionality statement but acknowledges that Chicana/Latina researchers have unique research perspectives and these experiences are strengths to the research process

(Delgado Bernal, 1998). Thus, a researcher bringing their whole self is regarded as an asset to the research process.

My identity as a Latina, first-generation college graduate, from a low-income family background has shaped my educational experiences and beliefs. I bring with me 10 years of professional experience of working with Latinx premed students from high school age to medical students. Through this time, I have gained insight to the obstacles and successes that STEM students face in higher education as they persist to graduate and advance towards medical school. In research papers, I report my positionality along with the concept of cultural intuition because my identity and experiences impact my research process from, design, research questions to analysis. Below is an example of bringing my whole self into the research process. This is my positionality statement that I shared at the beginning of all the pláticas.

> **Author:** So just a little bit about myself. I graduated from Sol University too, so I'm Sol University alumni. I graduated with a degree in Psychology and Ethnic Studies and then I got my Master's in Education and now I'm in the PhD program at Sol University, so really focusing on higher education. All the work that I've always done has revolved around, helping students from underrepresented backgrounds get access to higher education, from outreach programs. I also work at the medical school….working with diverse students. I've worked with students from different levels from high school, to undergrad, to now medical school, my research focuses on making sure students of color continue on to their goals.

Many of the students that were part of my dissertation I had known for a couple of years through my professional staff position. However, these students still enjoyed learning from me, many of them didn't know about my educational background. For new participants, they were surprised to find out about my educational background as a former student at Sol University. Other items that I shared with students are my home background, my first-generation college status and difficulties navigating higher education. By bringing my whole self to the research process, this allowed trust building with Latinx students. Through pláticas and Chicana/Latina

Feminist Epistemology, sharing of self is a groundbreaking process to engage with Latinx students in STEM.

Pláticas are two-directional and based on reciprocity, vulnerability, and researcher reflexivity

Reciprocity in STEM Research. Reciprocity is striving towards an equal relationship between the researcher and participant, a give and take relationship. Scholars of Color such as Figueroa & Sanchez (2008) and Acevedo-Gil (2019) have begun to share the key role of reciprocity for Scholars of Color conducting research with Communities of Color, such as the concept of 'buena voluntad'. Which is a concept that believes if researchers care about the well-being of the community being studied, then the researcher should enact 'buena voluntad,' with the aim to have a positive influence before, during, and after conducting research (Acevedo-Gil, 2019). Thus, the role of reciprocity is pivotal in a research setting and relationship. Reciprocity is needed in order for trust to exist and the development of a relationship between research and participants.

A question I asked myself while conducting my dissertation, how can I give back to the participants? Traditional journal articles take up to one year to be published. Many of the student participants were part of a student organization, Chicano/as for Community Medicine (CCM) and I decided to partner with them on a collaborative project. I engaged with one of my participants and three additional Latinx students in a new project, The Latinx Premed Guide. We worked on this project for a year and have jointly presented in various community and conference settings to share the Latinx Premed Guide, a tool for first-generation Latinx premeds navigating a R1 STEM research intensive campus.

Although challenging, reciprocity has many opportunities to turn one-way research into empowering interactions with student participants. Reciprocity needs to go beyond members-check and we must begin to re-imagine traditional ways of interacting with participants and giving back to participants in research. Below is a table of techniques to re-imagine reciprocity within STEM research.

Table 2.1

Re-imaging reciprocity within STEM research

Types of reciprocity	Description
Relationship development	Making time outside of the research space for follow-up meetings. Relationship building through time, trust and vulnerability.
Network	Sharing resources from STEM faculty and organizations. Exposure to hidden curriculum, research, internships and academic opportunities.
Funding	Stipends, gift cards for completion of pláticas. Sharing scholarship opportunities. Hiring students for paid internship and research opportunities.
Mentorship	Sharing resources, opportunities and mentoring of STEM students in research and career guidance.
Research collaboration	Shift to see students as research collaborators. Engage students in research process and projects, such as inclusion of students in the analysis, authorship and conference presentations.

Vulnerability. Pláticas methodology are very unique, in that the pláticas allow for the researcher to share parts of themselves to the participants and vice versa. The one-on-one time between myself, the researcher and the participant, went beyond the research questions but included sharing parts of my own educational trajectory. I shared my personal struggles navigating higher education, from feelings of isolation to family support and my own academic

challenges as well. I decided to share this information with students because we had similar experiences and I wanted the students to know that I was familiar with situations of navigating as a first-generation college student. The mutual sharing and vulnerability that occurs leads to the development of trust.

In the end of a plática, the participant and the researcher have established a relationship. The relationship goes beyond the research space of the plática and enters a new space of friendship, support and solidarity. The relationship then takes on new ways of gathering such as through email communication, mentorship and collaboration on community and research projects. This relationship building challenges normative practices of distant and formal interactions between participants and researchers in STEM education research. Normative practices such as surveys, focus groups and interviews that leave students after one or two interactions. Instead, through mutual sharing and vulnerability, pláticas can become a starting point to form authentic and meaningful relationships between the researcher and the participant.

The use of pláticas methodology requires extensive preparation, training, and the application of Chicana/Latina Feminist Epistemology and 'buena voluntad' of researchers. Pláticas rely on a relationship that is based on reciprocity, vulnerability, and researcher reflexivity (Avila, 1999). To embrace pláticas methodology, researchers need to reflect on their positionality and their approach to the research process. Below I review challenges that may arise when employing pláticas and opportunities for researchers to engage authentically with Latinx students in STEM research.

Pláticas require the researcher to have experience and training in creating a safe space for Latinx student participants. Experience working with diverse students is highly recommended, from teaching to mentoring diverse students. Training in methodology is important as it may be

challenging for researchers that have been trained in traditional interview format. For instance, training in advanced qualitative methods is important in order to explore the role of the researcher in qualitative methodology. Also, training in decolonizing methodology for researchers to unpack their bias in Western research and learn tools to centering Students of Color voices.

Also, to create a safe space, researchers need to be comfortable with their positionality and biases with STEM research. Researchers must process and unpack their positionality and how their positionality impacts their research views. Inclusion of a positionality statement in a manuscript is a start. However, a positionality statement is not enough, and ongoing researcher reflexivity is needed throughout the research process.

Researcher reflexivity. Researcher reflexivity is being conscious of how research affects and is affected by the research process (Watt, 2007). Researcher reflexivity involves self-examining the researcher's role in research and relationship to participants. In qualitative studies, a disconnection between the researcher and participant is recommended, to not taint participants and researchers' responses and findings. In pláticas, ongoing reflexivity is needed for the researcher throughout the research process to explore potential biases, assumptions and dispositions that the researcher brings to the research process. Below is a list of questions to cultivate a researcher's reflexivity:

1. What are your preconceived notions of Latinx STEM students?
2. Are you up to date on the recent Latinx student research in higher education?
3. Are you using asset-based frameworks? Asset-based terms?
4. Is your research team diverse and bilingual?
5. Are there any student responses that surprise you? Why?

6. How is your positionality and cultural intuition impacting your research process?

To maintain researcher reflexivity throughout the research process, the following qualitative tools can be used; journaling and memos. Journaling after pláticas is a practice that will allow researchers to reflect on their emotions, biases and allow for critical reflection during the pláticas. Journaling allows for notetaking and tracking of internal thoughts. Another method is the use of in-process memos. In-process memos provide insight to events or comments that resonates with the researchers during the ongoing research process (Maxwell, 1996). Also, tracking in-process memos are useful for the researcher to develop new interpretations and understanding (Maxwell, 1996). Both of these qualitative tools require the researcher to make time to stop in the research process and to record their thoughts.

Disruptions and shifts to advance STEM education research through pláticas

Now that I have provided an in-depth overview of pláticas methodology in STEM education. I will now present the use of pláticas methodology as the potential to disrupt dominant narratives in STEM research and shift deficit views of Latinx students. Pláticas methodology disrupts dominant narratives and advances STEM research frameworks to be asset-based by recognizing the everyday lives of Latinx students. By centering Latinx STEM student experiences, pláticas methodology is an opportunity to recognize the everyday lives of Latinx students dealing with a racial campus and microaggressions. Latinx students develop navigational strategies around issues of racism and microaggressions encountered in the university (Yosso, 2013). Through the principle of pláticas as a place of healing and inclusion of everyday lived experiences, pláticas allow for Latinx students to pause and critically reflect on their experiences in STEM. Through pláticas methodology, STEM researchers can begin to acknowledge how Latinx students are navigating and thriving in STEM in order to push forward

STEM research frameworks that are holistic and recognize intersectional identities and lived experiences of Latinx STEM students.

Also, pláticas methodology has the potential to shift deficit views of Latinx students to adopt asset-based frameworks in STEM research. An example of a culturally relevant methodological approach creating a new STEM framework is by Rendón et al. (2019). Rendón et al. (2019) conducted a qualitative study with 14 Latinx STEM students and used two methodological approaches of testimonios/testimony and counter-narratives to uncover paths and challenges of Latinx STEM scholars. The result is the Latinx Student STEM Success Model (Rendón et al., 2019) which provides a holistic model that includes Latinx STEM student assets/ventajas and knowledge/conocimiento. Central to pláticas is viewing Latinx STEM students as scholars and knowledge holders. This principle of pláticas is key in recognizing the knowledge that Latinx STEM students bring to campus, such as their familial and lingual assets (Rendón et al., 2014). Thus, STEM researchers must begin to use culturally relevant, race-gendered epistemologies and methodologies to advance STEM research frameworks that shift deficit perspectives of Latinx students.

Conclusion

Hooks (1990) encourages us to surrender to our marginality as it offers a radical perspective to see and create and to imagine alternative new worlds. My hope is that with this paper, Latinx researchers take space to acknowledge their knowledge and Latinx students' knowledge in STEM. From the margins, as a Latina emerging researcher, I present this paper on centering Latinx students through pláticas methodology. I hope to introduce Chicana/Latina Feminist Epistemology and pláticas methodology as an extension of recognizing Latinx researchers and Latinx STEM students.

Pláticas in STEM research is a promising methodology for Latinx researchers to engage, support and conduct research with and for Latinx STEM students. The following are key takeaways from the application of pláticas methodology in STEM education, the potential to humanize Latinx STEM students and recognizing the everyday lives and knowledge of Latinx students. To choose a transformative methodology, researchers must prepare and do the work in unpacking their positionality and engage in meaningful and reciprocal relationships with their participants. I hope that the readers of this article continue to move forward STEM research by choosing appropriate racial-gendered and culturally relevant methods.

Acknowledgements

Chapter 2, in part is currently being prepared for submission for publication of the material. Katherine Arias Garcia was the primary researcher and sole author of this material.

Footnotes

[1] I use the term Latinx to represent people that identify with Latin America and for gender inclusivity and to go beyond binary terms.

[2] All names are pseudonyms to protect the privacy of students.

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CHAPTER 3

Impact of COVID-19 Pandemic on the Future Generation of Latinx Physicians

Abstract

This article focuses on the impact of COVID-19 on Latinx undergraduate students persistence to medical school. Guided by Chicana/Latina Feminist Epistemology (Fierros & Delgado Bernal, 2016) and cultural assets from Latinx STEM Student Success Model (Rendón et al., 2019) this paper aims to take on an asset-based approach and center the voices and experiences of Latinx students in premedical studies as they persist towards medicine during a national pandemic. This study engaged 24 Latinx undergraduates during the summer of 2020, the height of the pandemic. Findings reveal the following themes on impact of COVID-19, 1) Navigating delays in medical school application timelines, 2) Navigating multiple stressors from home to health, 3) Navigating the online shift of clinical and volunteer experiences and 4) Motivations to address Latinx health disparities. Findings suggests Latinx students persisted in the face of a global pandemic and made connections to the larger structural issues that impact Latinx health outcomes.

Introduction

All throughout the United States, systems of higher education shutdown classrooms and converted to online distance learning. Latinx first-generation students had to return home and be a student in their home environments. However, moving back home included a set of challenges, such as sharing familial obligations and family financial challenges that impacted the home environment and the harsh realities that parents and loved ones were diagnosed with COVID-19 and other chronic health issues that were advancing (Pew Research Center, 2021). These were

stressful times for Latinx students, especially Latinx first-generation students that were finishing their academics and have been preparing to apply to medical school.

During the COVID-19 pandemic, the shortage of Latinx physicians was evident when Latinx communities, along with Black and Native communities suffered the highest death toll in the United States (AMA, 2020). The shortage of Latinx physicians is worrisome because of the critical role of Latinx physicians in providing cultural and linguistic care for diverse patients (Martinez et al., 2019). In the state of California, the growing Latinx and bilingual community is expected to exceed 40% of the state's population with only 5% Latinx physicians (Martinez et al., 2019). To address the Latinx physician shortage, immediate attention and examination of Latinx student persistence in premedical studies in higher education is required, especially during this critical time of the COVID-19 pandemic, when Latinx physicians are needed.

Despite science diversity initiatives in higher education, the number of Latinx students entering the field of medicine remains stagnant. Only 5% of the graduates from medical schools identify as Latinx in 2018-2019 (AAMC, 2019). This is part of the legacy of exclusion of Students of Color from medicine through affirmative action policies that have eliminated the use of race in medical school admissions in California and have resulted in health disparities (Jones, 2019). This brings our attention to the persistence of Latinx students in premedical studies and STEM fields, as STEM fields prepare students into medical school. Previous research has shown that Latinx students are entering college with high aspirations to pursue STEM fields, however, Latinx students graduate from STEM at a much lower rate than White and Asian students (Crisp et al., 2009; Hurtado et al., 2010). Thus, we have many things to learn from the Latinx premedical student persisters, as they are navigating as first-generation college students and the COVID-19 global pandemic. For premedical students, the summer time is an important time, to

advance through requirements for medical school, such as, science course requirements, clinical shadowing and Medical College Admissions Test (MCAT). However, COVID-19 impacted various summer time activities and worsened the difficult path to medicine for Latinx students as they navigate various cancellations, delays and familial obligations at home.

This study engaged 24 Latinx undergraduates during the summer of 2020, the height of the pandemic, when students were navigating various familial and academic disruptions as they persisted towards their medical dreams. This study focuses on the fastest growing student populations in higher education, Latinx first-generation students because of the severe COVID-19 impact on Latinx communities. The purpose of this study is to take on an asset-based approach to understand the experiences of Latinx students pursuing premedical studies during the COVID-19 pandemic. An asset-based approach challenges traditional deficit views of students and instead focuses on strengths of Latinx students in education. I am applying an asset-based approach in the following ways, 1) centering cultural assets of Latinx students and 2) examining the use of cultural assets to navigate structural issues. Thus, I draw on Rendon et al., (2019) and Yosso (2005) asset-based frameworks which recognize cultural assets of Latinx students navigating STEM environments. In addition, this study aims to contribute to the larger scholarship of Latinx first-generation students in STEM. I examine the impact of COVID-19 on the experiences of Latinx premedical students during the summer of 2020, when students were completing summer college courses, clinical shadowing activities, MCAT exam and completing their medical school applications. The following research questions guide this article:

Q) What disruptions did Latinx premedical students face during the COVID-19 pandemic?

Q) How did Latinx premedical students use their navigational and resistant assets to cope with the COVID-19 pandemic?

Latinx Students Pursuing STEM and Premedical Studies

To further center this paper on Latinx STEM students, below are the main scholars that have contributed to the Latinx STEM student experiences. Latinx students are more concentrated in Hispanic-Serving Institutions that include 25% Latinx students on campus. Research shows that HSIs are more successful in graduating Latinx STEM students (Camacho & Lord, 2013). Also, Garcia & Hurtado (2011) research on Latinx STEM students in HSIs, point toward the academic and social experiences as significant for predicting the likelihood of Latinx persistence in a STEM major. For instance, Garcia & Hurtado, (2011) reveal that an increased negative cross-racial interaction decreases the likelihood of persistence for Latinx STEM students. Also, recent scholars have contributed to the literature of Latinx STEM students experiences, role of *familismo* and institutional agents as key in supporting Latinx first-generation students (Bensimon, Dowd, Stanton-Salazar, & Dávila, 2019; Rodriguez, Pilcher, & Garcia-Tellez, 2019).

Furthermore, minimal studies focus solely on Latinx students pursuing medicine. The majority of the studies focus on the "leaky pipeline" in medicine due to experiences in 'feeder' courses and the low number of admission rates of underrepresented students in medicine (Barr, Gonzalez & Wanat, 2008, Alexander, Chen & Grumbach, 2009). Academic challenges in science courses lead students to change their major and change their career paths to pursue a non-STEM career (Crisp et al., 2009). Also, the MCAT exam is another item that is heavily weighted in medical school admissions and continues to remain a barrier for underrepresented students in reaching their medical school dreams (Agrawal, Vlaicu & Carrasquillo 2005, Nakae & Subica, 2021). The Latino/a Health Professions Pipeline (2012) provides insight to the

institutional barriers of Latinx students pursuing medicine, such as navigating academic environments and the critical role of student organizations in providing academic and social support to Latinx premed students. Thus, Latinx student's pursuing STEM face many barriers during their undergraduate years and the COVID-19 pandemic exacerbated these barriers.

Theoretical Framework

Centering cultural assets from Latinx Student STEM Success Model (Rendón et al., 2019)

This study is guided by asset-based frameworks, such as Yosso's Community Cultural Wealth (2005) and Rendón et al.(2019). Yosso's (2005) model uses critical race theory and frames students of color experiences from an asset-based perspective. Yosso's CCW (2005) model views students of color entering the college environment with cultural assets not traditionally seen by educators as important in a student's schooling trajectory. Latinx cultural assets/*ventajas* are student's strengths they have developed from their families, communities and ancestry, while knowledge/*conocimiento* are the knowledge that Latinx students have gained that are related to the Latinx asset/*ventajas* (Rendón, Nora & Kanagala, 2014). Rendón et al. (2019) expands on cultural assets and ways of knowing for Latinx STEM students, for the purpose of this study, I will be focusing on navigational and resistance assets from the Latinx Student Success Model to guide my exploration of the cultural assets and knowledge that Latinx students employed during COVID-19. These two assets/*ventajas* are in table 1, and their corresponding, ways of knowing/*conocimientos*. These two assets were chosen because both are related to overcoming barriers and obstacles and responses to those barriers.

Table 3.1

Latinx STEM student assets/ventajas & ways of knowing/conocimientos (Rendón et al., 2019)

Assets/Ventajas	***Ways of knowing/Conocimientos***
Navigational	*Able to navigate twists, turns and stalls, i.e. change of major, transitioning from another nation and learning new culture*
Resistant	*Overcoming life and academic-related challenges; addressing inequities and underrepresentation of Latinxs in STEM; aligning with social justice consciousness and equity imperatives*

Methods

This study is based on twenty-four Latinx premed students from a large research university, located in Southern California, near the San Diego and Mexico border region, referred to as Sol University. Sol University's campus demographics for 2018-2019 are Black 2.67%, Latinx 20.35%, Asian 53.32%, White 19.28%, American Indian/Alaska Native and Native Hawaiian <1% and Other 3.25% (Campus institutional research, 2019). The campus is an emerging Hispanic-Serving Institution (HSI) with 20% Latinx students. Sol University was chosen based on four criteria: research productivity classification, large science presence on campus, high Latinx premeds presence on campus and medical school on campus. IRB obtained through campus IRB office.

The participants were recruited via direct emails, through campus resource centers and student organizations. Also, through researcher's professional experience working in a medical school, she reached out to students that met the criteria. The following is the selection criteria:

students must identify as Latinx, Latino/a, Chicano/a, or Hispanic, students are in their junior, senior year or recent college graduates from Sol University, must demonstrate an interest in applying to medical school within the next three years. A total of twenty-four participants agreed to the study, fourteen females and ten males. Each participant completed two pláticas with researcher. Data collection was conducted in the summer 2020 and due to the COVID-19 pandemic, pláticas were conducted online with zoom platform.

Pláticas

Pláticas are a methodological approach that draws from Chicana feminist epistemology (Fierros & Delgado Bernal, 2016). Chicana Feminist epistemology acknowledges and centers Chicana and Latina scholar's ways of knowing and knowledge (Fierros & Delgado Bernal, 2016). Chicana Feminist Epistemology is a framework that includes the methods of pláticas as an extension of a particular way of knowing (Fierros & Delgado Bernal, 2016). Pláticas have been used by various researchers in educational research with Latinx youth and Latina mothers (Gonzalez & Portillos, 2012; Guzmán, 2012). Pláticas were chosen over traditional interviews because pláticas respect participants as knowledge holders and draws from the everyday lives of students of color. Pláticas are an appropriate method to use because this study is on Latinx students, emphasizes the relationship building between researcher and participants, which requires reciprocity and mutuality (Fierros & Delgado Bernal, 2016).

The pláticas were semi-structured and two pláticas were conducted with each per participant, (1-hour average). Each plática was recorded and transcribed verbatim. The pláticas were conducted from June 2020 – September 2020, during the height of the COVID 19 pandemic. Initially, pláticas were going to be conducted in person, but due to the pandemic, switched to virtual pláticas through the use of Zoom platform. The first plática focused on

relationship building between the researcher and participant, explanation of the project and learning about participant's family and education background. The second plática focused on participants experiences in premedical studies and campus resources. As the plática is meant to create a space for vulnerability, I shared my experiences and struggles as a first-generation student in Sol University. The pláticas also allowed the Latinx students to share unexplored topics that are important in their college trajectory.

Analysis

All pláticas were transcribed and members checks were conducted with participants. The qualitative software, MAXQDA, was used for coding and development of themes. This study uses grounded approach for the analysis of data that is driven by a Chicana Feminist Epistemology. I employed the notion of 'cultural intuition,' which is the Latina researcher bringing their professional and personal experience into the research process and analysis (Bernal, 1998). My cultural intuition guided my pláticas with the students and my follow up questions. I wrote memos after each plática to make sense of emerging themes. Also, individual case reports were written for each participant in order to conduct cross-case analysis. Case reports allowed comparison and contrast of students with different majors and their experiences with COVID-19 pandemic occurring during the summer of 2020. Initial codes were created based on Rendón et al. (2019) cultural assets and I completed a second cycle of coding to refine and combine some of the first round of codes. Lastly, a codebook was created and guided by the literature of Latinx students in higher education.

Findings

My findings point to four ways that Latinx students were impacted by the COVID-19 pandemic on their pursuit of a career in medicine during their critical undergraduate years. The

four themes will be discussed in this paper, including the impact of COVID-19, 1) Navigating delays in medical school application timelines, 2) Navigating multiple stressors from home to health, 3) Navigating the online shift of clinical and volunteer experiences and 4) Motivations to address Latinx health disparities. Initial research on Latinx students experiencing a pandemic has found attrition of Latinx students in STEM, however I find that Latinx students are persisting in the face of a global pandemic and making connections to the larger structural issues that impact Latinx health outcomes. Also, I present the unique Latinx cultural assets that Latinx premedical students use as they persisted in their premedical studies during COVID-19.

Navigating delays in medical school application timelines

Applying to medical school is a yearlong process. The COVID-19 pandemic impacted various aspects of the medical school application process for Latinx students, especially the cancellation of the MCAT exam and delay in submission of medical school applications. In this section, we learn about Sabrina and Daniel, who applied to medical school in 2020 and experienced additional obstacles due to the COVID-19 pandemic in completing their medical school applications.

Sabrina is a first-generation college graduate, Mexican-American, and she majored in Ethnic Studies and Public Health. Sabrina has been interested in pursuing medicine since she was young, when her family encountered health problems. She recently graduated from Sol University and was working on her final requirements for medical school when the COVID-19 pandemic hit the US. Sabrina recounts the impact of COVID-19 on her admissions timeline, “Initially I wanted to apply this year. I had everything ready and I [had] my letters of recs, pretty much the whole application. But the MCAT got cancelled and then it got reopened again but I was out of town and now most of the appointments are pretty much booked and there's very few

that are left that are available and just like the very end of September… so I decided to wait just an extra year and hopefully apply next year."

Sabrina is very committed to apply to medical school, however, the MCAT rescheduling caused Sabrina to decide to delay her timeline to medical school by one year. Taking the MCAT early in the summer is important because many medical schools use the MCAT score to determine advancement in application status, thus Sabrina decided that a September MCAT date was too late for her to submit her medical school applications. Similarly, Daniel, a Latino, transfer student, majored in Molecular Biology and had plans to apply to medical school during summer 2020.

> I was going to apply this cycle but I'm still deciding on that but, so either this cycle or the next cycle…things are a little rough this year, so still trying to figure it out….my [MCAT] was cancelled three times. Originally it was in March and I moved it to another time in March that got cancelled…I moved it to the beginning of April and it got cancelled again. Then I moved it to August simply because I wasn't expecting anything worse to happen. But I just feel like during that time it really kind of messed up my schedule. Like originally, I felt really good and I was working really hard hitting things that I wanted to hit in that schedule. But things just kind of fell apart.

Daniel had invested his time in preparing his application materials and studying for the MCAT exam. However, the COVID-19 pandemic interrupted his timelines, momentum and his designated time to focus on medical school applications. Daniel was not in control of his MCAT exam date which led to an unpredictable studying schedule. Both Daniel and Sabrina felt overwhelmed with the rescheduling of the MCAT exams and decided to postpone their medical school application submission.

The COVID-19 pandemic caused the MCAT exam to be canceled and led to multiple rescheduling of students, all while Latinx students were moving back home and finishing up their medical school application. Students were ready to apply to medical school, however due to

the various MCAT rescheduling they decided to pause and delay their application. This was a decision making process for Latinx students because they were aware of the weight of the MCAT on their applications. Latinx students were navigating the role of a high-stakes exam in their admissions. This was a time of high stress for students as they were delaying their goals of applying to medical school.

Navigating multiple stressors from home to health

During the COVID-19 pandemic, Latinx students were exposed to a variety of triggers that impacted their mental health. The Latinx students are enrolled in Sol University, which is a research one university with a heavy STEM focus. Sergio, a first-generation Mexican-American studying Global Health, shares his experiences as a premed in Sol University, "the journey [is] stressful…it's very competitive at [Sol University],…whether it's academic or extracurricular." All the Latinx premed students were accustomed to dealing with a competitive and stressful environment. However, my findings reveal that Latinx students pursuing medicine experienced additional high levels of stress during the COVID-19 pandemic. In this section, the Latinx premedical students Jessica and Sabrina, share their mental health struggles and impact on their wellness during the COVID-19 pandemic.

Jessica is a first-generation college graduate, Mexican-American from a large urban community that is predominantly Mexican. Jessica's interest in medicine began when she was young when her siblings encountered multiple health issues. Jessica was in the process of applying to medical school during the summer 2020 and she shares her challenges, "so it's actually a mixture [activities during COVID] and also family health issues that are happening right now. My mom is actually sick and I have another family member that was diagnosed with

stage 4 pancreatic cancer. So it's kind of difficult at home and also my MCAT alongside that was cancelled twice and I was always trying to reschedule, trying to find a perfect date for it."

Jessica was experiencing multiple high-stress activities during the pandemic. She had been preparing to take the MCAT exam for a year and was experiencing the COVID-19 pandemic during her final year of college. Also, Jessica was dealing with multiple health issues with close family members that required follow-up doctor appointments and emotional support in dealing with a stage-4 cancer diagnostic. Additionally, Jessica had moved back home in Los Angeles during the shift to online learning because of COVID-19. Jessica shared the following regarding remote learning at home. Jessica shares, "there's not really a designated area for me to study…I'm in my dad's [space]…I don't have a desk here to study….I study either on the floor or on the kitchen table so it really is a difficult shift."

Jessica, like many students that returned home, had difficulty in finding a designated space to study. On top of all her family health problems, Jessica did not have her own space at home to fully dedicate to her studies. Jessica was balancing the following, moving home, finding a study space, rescheduling and taking an exam, and supporting her family, all while in her final year in college and during the height of the pandemic.

Another stressful situation that occurred for Latinx students was termination of employment. Sabrina is a recent graduate and during her gap year, she was working full-time. Sabrina shares her stressful summer time activities. Sabrina says, "well I was employed, but I'm unemployed now [because] of the whole COVID-19 and my company that I was working for, they are not going to be opening anytime soon. So I am in the process of finding another job and I'm studying for the MCAT like crazy too."

Many of the Latinx premed students had multiple jobs while they were enrolled in college and once they graduated they had full-time employment to sustain themselves and their families. Searching for new jobs included students dedicating extra time for job hunting, completing job applications and interviews. Thus, the Latinx students pursuing medicine experienced multiple life-changing events at the same time during the COVID-19 pandemic. Students were experiencing the pandemic and high-stress issues that included family members' health, rescheduling of a high-stakes exam MCAT and searching for employment.

Navigating the online shift of clinical and volunteer experiences

Another item the COVID-19 pandemic had a direct impact on was the stoppage of clinical and volunteer experiences for Latinx students. COVID-19 caused the closure of clinics because of a focus on COVID-19 patients and stay at home orders in California. Many students volunteer at clinics to complete clinical shadowing hours and volunteer hours that are a requirement to apply to medical school. The stoppage of these activities led to Latinx premed students using their navigational assets to adjust and shift in response to the various changes due to COVID-19. In this section, we learn from the experiences of Cynthia and Sara as they navigated their clinical experiences during summer 2020.

Cynthia is a Latina, Mexican-American, first-generation, premedical student that majored in Human Biology. Cynthia's interest in medicine began when she was young, with her own doctor appointments with a cardiologist. Cynthia experienced multiple stoppages during the summer of 2020. Cynthia shares, “all my volunteering, kinda got…you know, paused, I had just starting shadowing and that can’t really happen right now, so hopefully when things…get better I want to shadow again. I am volunteering right now at the clinic because we are doing phone calls and the Zooms appointment[s].”

Although Cynthia's clinical shadowing experience was cancelled, she was able to shift and find a virtual option. Cynthia volunteered in a local Student-Run Free Clinic, that had transitioned to virtual and provided telehealth appointments via zoom. Cynthia was previously serving as a translator for this clinic, and through her connections, she was able to return to gain additional clinical virtual experiences.

Another student, Sara, a third year student that majored in Human Biology has a passion for working with underserved communities, such as her hometown of Tijuana, Mexico. Her interest in medicine was sparked by her community and familial experiences with medicine. She was looking forward to participating in an international clinic in Tijuana that offers an opportunity to work with Spanish speaking patients. However, COVID-19 pandemic occurred and her plans dramatically changed. Sara shares her experiences, "so [I] am currently doing [the] internship that usually goes to Tijuana every weekend, but now…it's all virtual and it's like I just really missed the interaction that you have with people... I wish I would have done it sooner so I would of had more valuable experiences of actually seeing with my eyes like the surroundings not just the [zoom] square."

Sara had been looking forward to her internship for a whole year. However, Sara was able to adjust to the virtual environment, given her knowledge and familiarity with the population of Tijuana and community needs. Sara's cultural knowledge and Spanish skills led her to still be able to have a meaningful virtual experience.

Thus, the Latinx premedical students had to quickly shift their expectations and navigate their involvement in clinical and volunteer experiences. There was a cancellation and pausing of experiences and shift to virtual through telehealth and phone/zoom sessions. Along with many providers, the Latinx students also shifted their involvement and employed technology in order

to navigate the COVID-19 impact on clinical and volunteer sites. Latinx students also navigated by employing their cultural knowledge of their communities and their own social networks in order to ease their virtual transition.

Motivations to address Latinx health disparities

COVID-19 pandemic revealed to the world the current health disparities that exist throughout the US and that impact communities of color in disproportionate numbers. This was more prominent in Latinx communities that experienced the highest levels of COVID-19 infections and deaths (Pew Research Center, 2021). However, the COVID-19 pandemic reinforced Latinx student's motivations to pursue medicine in order to tackle issues of health disparities. In this section, Diana, Silvia and Sergio, discuss their understanding of the social determinants of health during the COVID-19 pandemic.

For instance, Diana is a Latina, Mexican-American, premedical student from Los Angeles. Diana is a third year student, majoring in Human Biology and Global Health. Her family health experiences with physicians and the health-care system has impacted the type of physician she wants to be in the future. Diana plans to be a physician that works in a predominantly Latino Spanish speaking community. Diana shares, "when COVID came out, a lot of testing was in higher income areas…based on what I see and read, [higher income areas] have a lot more resources. So I want to go where the help is needed."

During the summer of 2020, Los Angeles was a city that had the largest racial disparities in testing and exposure to COVID-19, for diverse and low-income communities (Kim et al., 2020). Diana's awareness of the lack of resources in low-income communities solidified her motivations to become a physician that works in an underserved and low-income community.

Diana recognizes that low-income communities did not have equal access to COVID-19 testing, which is an example of socio-economic status as a social determinant of health.

Also, Silvia, a third year student, Mexican-American, majored in Global Health. Silvia is from a rural community, located in Central California. Silvia's interest in medicine began when she was young and she would accompany her parents to their doctor's appointments to serve as a Spanish translator. During the summer of 2020, Silvia realized that Latinx communities were not receiving COVID-19 information in Spanish. Silvia took immediate action to assist Spanish speaking Latino families during the COVID-19 pandemic and led a student-initiative project to address lack of COVID-19 Spanish materials. Silvia shares, "I'm in charge of a Facebook we created, a Spanish COVID-19 San Diego Facebook page." Silvia assisted in the creation of a network of Latino undergraduates and Latino medical students. The mission of the group was to address the lack of educational materials and information in Spanish, where Spanish was the dominant language in the greater San Diego community. Silvia's awareness that Latinx communities were being excluded from important COVID-19 educational information led to her further be committed to becoming a bilingual physician to work with Spanish patients.

Lastly, I share my pláticas session with Sergio. Sergio's interest in medicine began in high school when he was exposed to STEM careers. During our pláticas, Sergio would bring up additional context during summer 2020, such as the nationwide protests across the US, which was sparked by the death of George Floyd, all summer long during the COVID-19 pandemic, many youth were protesting on the streets with masks for racial justice. Also, Sergio and I had a second pláticas regarding diversity efforts in medicine and attempts to recruit underrepresented students into medicine. However, Sergio brings up issues of institutional racism that impact diversity efforts. Sergio connects issues with GPA, MCAT scores, and applications process, and

we discuss how these issues are deep structural issues and obstacles in advancing the physician pathway and Latinx health outcomes. We finish the plática with Sergio's motivation to tackle these structural issues and to address Latinx health disparities when he becomes a physician.

Discussion

Although the COVID-19 pandemic was occurring and brought many businesses and activities to shut down, the first-generation Latinx students did not shut down on their pursuits of becoming a physician. COVID-19 brought a set of new challenges to the Latinx first-generation students that caused them to pause, delay and convert to virtual and make connections to the larger structural issues that impact Latinx health outcomes. These challenges exacerbated the entry of Latinx students into medicine, a challenging pathway that has historically excluded Latinx students. Below I will discuss the long-term impacts of the disruptions that occurred during COVID-19 and the how Latinx student's cultural assets and knowledge can be leveraged to recover from the impact of COVID-19.

COVID-19 impacted Latinx students' preparation and submission of medical school applications. The majority of the Latinx students shared they will be delaying their applications to medical school. The delays in timelines is very concerning, as Dr. Hayes-Bautista (2018) and his team published a report, on Latinx physician workforce, that it will take 500 years for Latinx physician parity to be reached. A career in medicine requires many years of training, from undergraduate schooling to medical school and specialty residency training. Also, one-third of Latinx students enter medical school through community college (Talamantes et al., 2016), thus having a long undergraduate career. This paper finds that during the COVID-19 pandemic, Latinx students are delaying their application timelines to medical school. Thus delaying even more reaching physician parity and furthering underrepresentation of Latinx students in

medicine. To recover from COVID-19 delays, medical schools and undergraduate institutions must partner to support Latinx students during these critical gap years caused by COVID-19. Programs such as University of California, Davis MEDPREP and University of California, Los Angeles, MEDPEP are exemplars of supporting diverse students in the premed pathway.

Additionally, COVID-19 disruptions contributed to an already stressful application season for Latinx first-generation students. Many medical schools were flexible with MCAT dates during the admissions cycle in 2021. The flexibility was useful to the Latinx premeds, many of them rescheduled to a later date, but from this study, only 1 student decided to apply to medical school. The 2020-2021 medical school admissions cycle was a unique year with an increased applicant pool, which many people refer to as the 'Fauci effect'. However, I argue, a rise of Latinx applicants is a sign of resiliency of Latinx students. Many of the Latinx students faced multiple disruptions during the summer of 2020. These disruptions from moving back home, to no designated study space to employment issues, all are part of Latinx student complex lived experiences that are also navigating familial obligations, health care needs of family and navigating a career as a first-generation. These stressors and complexities require support for Latinx students to ensure that their mental state is optimal for academic progression.

Furthermore, Latinx students' cultural assets of navigational and resistant were key in Latinx students survival during COVID-19 pandemic. Although first in their families to attend college, Latinx students tapped into their cultural strengths to navigate the various obstacles during COVID-19. Navigational assets allowed students to shift quickly to the virtual environment and adjust to the already difficult application cycle. Nationwide, Latinx students were responding to a virtual classroom and ongoing changes in MCAT delays. Latinx students made choices to delay their applications in order to best prepare for medical school. Also, Latinx

students were able to tap into their resistant asset as they witnessed the health disparities of COVID-19 nationwide and were moved to action to address the inequities through service such as translations in Spanish. Latinx students motivations to become Latinx physicians was also reinforced from the racial health disparities from the COVID-19 pandemic. As campuses reopen, these cultural assets must continue to be embraced and aligned with student's academic and career trajectories. For example, establishing partnerships with Latinx community health clinics, to support Latinx students completing clinical hours and to develop their resistant assets as they continue on their path to become physicians to serve Latinx communities.

The challenges that Latinx students experienced during COVID-19 must be recognized in order to fully respond and support Latinx students. In order to serve Latinx students, institutions of higher education must become Latinx responsiveness, which requires a greater understanding of the inequities that exist in education and the support needed to mitigate the uneven resources and investments made in Latinx students (Contreras, 2019). This paper hopes to shed light to the critical growing Latinx first-generation students that are pursuing medicine in order to address the barriers they faced during COVID-19. Below are higher education and policy recommendations to get us back to reaching Latinx physician parity and preparing bilingual and culturally competent physicians.

Policy and Higher Education recommendations:

1) *National investment to address Latinx physicians shortage.* National organizations must create targeted funding opportunities to address Latinx physician shortage and supporting Latinx premedical students at the undergraduate level.

2) *Development of Latinx Premedical Pathways between community colleges, undergraduate campuses and medical schools*. Pathways centering Latinx first-generation identities and cultural assets to support retention and persistence into medical school.

3) *Increase mental health resources for Latinx premedical students.* Latinx psychologist and diverse clinicians that are knowledgeable on complexities of Latinx lived-experiences, first-generation college status, bilingual and familiar with challenges from COVID-19 pandemic.

In conclusion, Latinx first-generation premedical students have demonstrated their resiliency in the face of a global COVID-19 pandemic. Continued investment in the future generation of Latinx premedical students is needed to be prepared for the ongoing COVID-19 pandemic and to address existing Latino physician shortage. This paper hopes to shed light into the challenges that COVID-19 brought during 2020 and the unique needs of Latinx premedical students during their critical undergraduate years and their cultural assets that will make them into bilingual and advocates for Latinx communities.

Acknowledgement

Chapter 3, in part, has been submitted for publication of the material as it may appear in Journal of Latinos in Education. Katherine Arias Garcia was the primary researcher and sole author of this material.

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CHAPTER 4

An examination of 'Giving Back' asset and knowledge of Latinx first-generation premed students in an Emerging Hispanic-Serving Institution

Abstract

This paper takes an asset-based approach in examining the cultural asset and knowledge 'giving back' of Latinx first-generation premed students in an Emerging Hispanic-Serving Institution. Findings reveal four ways Latinx premedical students use the cultural asset and knowledge of 'giving back' to address health inequities in their future careers as physicians. The four ways to 'give back' are 1) Giving back through Spanish language skills to address language barriers, 2) Giving back through volunteering in Latinx communities, 3) Giving back by creating infrastructure for Latinx premed students, 4) Giving back to underserved communities in future medical practice. Discussion includes the important role of Latinx student's lived experiences, knowledge and leveraging 'giving back' asset in higher education. Recommendations for institutions of higher education on ways to center Latinx student's cultural asset of 'giving back'.

Keywords: Cultural assets, asset-based theories, Latinx premeds, giving back, aspirations

Introduction

Addressing Latinx student underrepresentation in medicine is a national priority to meet the national physician shortage needs and Association of American Medical College's Diversity goals (AAMC, 2019). In the state of California, Latinx students are the fastest growing student group, for example, Latinx youth make up 54% of K-12 youth (Legislative Analyst Office, 2019). Additionally, the growing Latinx and bilingual community is expected to exceed 40% of the state's population with only 5% Latinx physicians (Martinez, et al., 2019). The Latinx physician disparity is important because of the critical role of Latinx physicians in providing cultural and linguistic care for diverse patients (Mitchell & Lassiter, 2006). According to the,

Diversity in Medical Education: Facts & Figures (AAMC, 2019), Latinx students make up only 6% of matriculating students into a US medical school in 2018-2019 and 5% of Latinx physician graduate from medical school nationwide in 2018-2019 (AAMC, 2019). Thus, to increase retention in premed studies, further understanding is needed of the motivations and aspirations of the Latinx persisters in the premedical pathway.

Many students are drawn to medicine for altruistic reasons to serve and heal people. For instance, Antony (1998) found that premedical students have altruistic personalities and McGee & Bentley (2017) found that one of the characteristics of science students is desire to help others through research. Moreover, within the STEM literature, there has been some attention to Students of Color in STEM and their motivations to improve society and give back to their communities (Jackson, 2016; Garibay, 2013). For instance, Jackson examines prosocial goals of diverse STEM students and Jackson finds that the subgroup of Latinx first-generation students studying STEM have more complex prosocial goals that are related to giving back. Additionally, the STEM field is shifting to embrace asset-based frameworks to examine Latinx students in STEM and these new findings are beginning to shed light to Latinx student's motivations in STEM. For instance, the latest findings of Latinx students in STEM are grounded in community and with a desire to give back in STEM (Kanagala et al., 2016; Rendón et al., 2019; Herrera & Kovats Sanchez, 2022). However, the STEM researchers usually don't differentiate between the aspirations of attending science graduate and medical school (the premeds). This is an important distinction, as medical schools have an inherent mission to prepare students to serve and become clinicians to serve patients. Thus, this paper will be examining a domain specific group, the STEM premeds that are pursuing medicine and students that identify as Latinx first-generation.

Additionally, Hispanic-Serving Institutions (HSIs) and Emerging Hispanic-Serving Institutions (eHSIs) are on the rise nationwide. HSIs are a federal designation of campuses with 25% Latinx student enrollment, while Emerging HSIs enroll 20-25% Latinx students. HSIs are important because they respond to the changing demographics and serve 66% of the enrolled Latinx students nationwide in higher education (Excelencia, 2022). Additionally, research shows that HSIs are key in Latinx student pathways in STEM (Herrera, 2020; Herrera et al. 2018; Herrera & Hurtado, 2014) and have stronger community engagement partnerships (Ramirez & Rodriguez-Kiino, 2020). Moreover, emerging HSIs continue to increase, in 2019, there were 362 Emerging Hispanic-Serving Institutions and in 2020, 393 Emerging Hispanic-Serving Institutions (Excelencia, 2022). This study takes place in an eHSI and contributes to the dearth of literature of Emerging-HSIs and research-intensive eHSIs.

Therefore, as Latinx students are increasing nationwide, in STEM/premed and in Hispanic-Serving Institutions, a greater understanding of the role of 'giving back' in their aspirations and persistence in premedical studies is needed. The potential role of 'giving back' can retain Latinx students in premedical studies in research-intensive eHSIs. The purpose of this article is to examine in-depth the Latinx cultural asset of 'giving back' and how 'giving back' operates in the persistence of Latinx students in premed studies. The following research questions guide this research:

Q: How do Latinx first-generation students operationalize the cultural asset of 'giving back' as premed students?

Q: How does 'giving back' shape aspirations to pursue medical school?

Literature Review

Few studies solely focus on the concept of "giving back" and instead focus on the role of 'giving back' in relationship to motivations, volunteering and teaching careers for diverse students. To center this paper on 'giving back', I provide a brief overview of the concept of 'giving back' applied to diverse groups such as, Native American and Latinx students and within Latinx students in STEM.

'Giving Back' for Native American and Latinx Students

For Native American students, the role of 'giving back' plays a critical role in persistence in higher education. For instance, Brayboy et al., (2014), Guillory & Wolverton (2008) and Guillory (2009) have examined 'giving back' as a key factor impacting persistence during college and post-graduation, focusing on expectations to give back to native communities. While Guillory (2009) focuses on Native students from tribal communities and with family members in tribal communities, their plan is to 'give back' to tribal communities post-graduation. Waterman and Lindley (2013) point to 'giving back' as part of nation building, which recognizes larger structures that excludes Native students. Additionally, Salis Reyes (2019) examines Native graduate students and their ways of 'giving back' to tribal communities with graduate degrees and the notion of return home to serve Native communities. Lastly, Page-Reeves et al., (2019) and Smith et al., (2014) highlights the difficulties of Native students pursuing STEM specific degrees and careers in envisioning 'giving back' in STEM careers and maintaining commitment to communal goals, which leads to issues in persistence in STEM.

While for Latinx students, the literature has associated 'giving back' to culture and collectivist orientation and the teaching profession. The Latinx collectivist orientation extends to giving back to communities. For instance, Storlie, Mostade, & Duenyas (2016) examines Latinx

first-generation career choices and uncovers the importance of responsibility of Latinx students to give back to their communities. Giving back is expressed in various ways by Latinx students, including in higher education by undocumented Latinx students that 'give back' through volunteering in community engagement (Contreras, 2009). Additionally, the concept of 'giving back' also arises for Latinx students' plans to support their families post graduation. Sy and Romero (2008), point to Latina college students' sense of family responsibilities to give back financially to their families. Moreover, a few studies examine the critical role of Latinx student's 'giving back' and careers, most of these studies focus on teaching careers. For instance, Storlie et al., (2016) point to the critical role of 'giving back' for Latina first-generation students to their families and communities. Flores (2017) highlights the complexity of teaching by Latina teachers and their daily teaching processes to 'give back' to Latinx families and financially to their own families.

'Giving Back' for Black and Latinx students in STEM

Moreover, various researchers within STEM education have pointed to the unique role of 'giving back' for Black and Latinx students. Researchers have pointed to Black and Latinx STEM students' motivations to improve society and 'give back' to their communities (Jackson, 2016; Garibay, 2013). For instance, McGee and Bentley (2017) point to Black and Latinx students' STEM aspirations as being grounded in helping others. The concept of helping others was further developed into the concept of equity ethic by McGee and Bentley (2017) which is a concern for social justice and helping by 'giving back' to marginalized communities. Furthermore, Jackson et al., (2016) points to intersectional identities of underrepresented students and first-generation college students, as having strong prosocial values for pursuing science, such as 'giving back' to the community. Additionally, Jackson et al, (2016) reveals the

uniqueness and complexity of Latino first-generation students in the sciences, because they have strong prosocial goals, along with strong cultural backgrounds and family-specific prosocial goals, such as 'giving back' to families. Thus, further research in intersectional identities of STEM students is needed to understand 'giving back', such as first-generation and a focus on Latinx STEM premed students.

Furthermore, the latest STEM education research on Latinx students includes asset-based frameworks which have been able to shed light on the lived experiences and motivations of Latinx students to pursue STEM. Rendón, Nora and Kanagala (2014) first began to examine Latinx STEM students and 'giving back' was discussed as something larger in their lives than a STEM degree, but a means to help their community and 'giving back' to their community. The latest Latinx STEM research has pointed towards the positive influence of parents in Latinx STEM persistence, (Rincón, Fernandez, & Hinojosa, 2020; Rodriguez & Blaney, 2020). López et al. (2019) identified familismo or the strong identification to family as a cultural practice enacted by Latinx undergraduates in Science and Engineering. Also, Rincón et al., (2020), states that first-generation Latinx STEM students are engaged in community cultural wealth, resistance, as they navigate STEM and remain anchored in community during their studies. The role of community in Latinx STEM students is furthered by research by Herrera and Kovats Sánchez (2022), that argue community and family are critical in Latinx student identity and persistence in STEM. These studies offer insight to the critical role of 'giving back' and its connection to community and family in Latinx STEM students. And the gap of Latinx premedical STEM students that are aspiring to enter the field of medicine that may be more inclined to serve patients. Additionally, there is a gap in the literature in understanding the intersectionality of

identities, such as first-generation Latinx students 'giving back' in their future careers in medicine.

Theoretical Framework

This study is guided by asset-based frameworks, Yosso's Community Cultural Wealth (2005) and Rendón et al.(2019), Latinx Student Success Model. Yosso's (2005) model uses critical race theory and frames students of color experiences from an asset based perspective. Yosso's CCW (2005) model views students of color entering the college environment with cultural assets not traditionally seen by educators as important in a student's schooling trajectory. To further center the Latinx cultural assets and student's lived experiences, the following framework is applied, the Latinx Student STEM Success Model by Rendón et al., 2019, which draws from Yosso's CCW model and centers Latinx STEM student's cultural assets and knowledge.

Latinx cultural assets/*ventajas* are student's strengths they have developed from their families, communities and ancestry, while knowledge/*conocimiento* are the knowledge that Latinx students have gained that are related to the Latinx asset/*ventajas* (Rendón, Nora & Kanagala, 2014). For example, navigational asset and the knowledge is the ability to navigate twists and turns in higher education such as changing majors and learning a new culture (Rendón et al., 2014). Moreover, the Latinx Student STEM Success Model is made up of items that impact Latinx STEM student success, such as mentorship, finances, student organizations, familial and cultural assets and ways of knowing. In this study, I will be focusing on *cultural assets and ways of knowing* from the Latinx Student STEM Success Model to take an asset-based approach and recognize Latinx STEM students strengths in their culture and knowledge. An asset-based approach is important because Latinx STEM students are traditionally viewed

through a deficit lens as lagging in the field of STEM. Additionally, first-generation students are also viewed as lacking knowledge as they enter higher education. Thus, this paper is guided by the framework of Rendón et al., (2019) Latinx STEM student's cultural assets and knowledge.

For this study, I will be focusing on one of the cultural assets of Latinx STEM students, the 'giving back' cultural asset. Rendón et al., (2019) further conceptualizes the cultural asset of 'giving back' along with its ways of knowing/*conocimiento* into the following 1) providing service to Latinx community and the greater society and 2) addressing inequities and underrepresentation of Latinxs in STEM. Examples of the 'giving back' asset from Rendón et al., (2019) are Latinx STEM students engagement with research that focuses on climate change and environment for providing services to Latinx community and greater society. Also, Latinx STEM students address inequities and underrepresentation of Latinx in STEM through advising and encouraging Latinx STEM undergraduates. These are a few examples of the 'giving back' asset of Latinx STEM students and I will apply this framework to the specific domain of Latinx premed STEM students.

Additional concepts guiding this paper are familismo and community. Familismo has been shown to impact Latinx student identity within STEM (Rodriguez, et al., 2019). Along with centering of communities for Latinx STEM students (Rincón et al., 2020; Herrera & Kovats, 2022). Combined, these inform my examination of 'giving back' cultural assets, as being inclusive of families and communities have been shown to ground Latinx students in STEM. Thus, understanding how Latinx first-generation premed student's conceptualize 'giving back' can inform how to better prepare the next generation of Latinx physicians and serve the Latinx premeds within STEM education.

Methods

This study is based on twenty four Latinx premed students from a large research university, located in Southern California, near the San Diego and Mexico border region, referred to as Sol University. Sol University's campus demographics for 2018-2019 are Black 2.67%, Latinx 20.35%, Asian 53.32%, White 19.28%, American Indian/Alaska Native and Native Hawaiian <1% and Other 3.25% (Campus institutional research, 2019). The campus is an emerging Hispanic-Serving Institution (HSI) with 20% Latinx students (Campus institutional research, 2019). Sol University was chosen based on four criteria: research productivity classification, large science presence on campus, high Latinx premeds presence on campus and medical school on campus. IRB obtained through campus university.

The participants were recruited via direct emails and through campus resource centers and student organizations that are aimed at Latinx premed students. Additionally, through my professional experience working in a medical school, I reached out to students that met the criteria. The following is the participant selection criteria: students must identify as Latinx, Latino/a, Chicano/a, or Hispanic, students are in their junior, senior year or recent college graduates from Sol University, must demonstrate an interest in applying to medical school within the next three years. A total of twenty-four participants agreed to the study, fourteen females and ten males, see table 1 in appendix. Each participant completed two pláticas with the researcher. Due to the COVID-19 pandemic during data collection in summer 2020, pláticas were conducted online with the Zoom platform. Each participant filled out a consent form and received a $30 gift card for their participation.

Pláticas are a methodological approach that draws from Chicana/Latina Feminist Epistemology (Fierros & Delgado Bernal, 2016). Chicana/Latina Feminist Epistemology

acknowledges and centers Chicana and Latina scholar's ways of knowing and knowledge (Fierros & Delgado Bernal, 2016). Chicana/Latina Feminist Epistemology is a framework that includes the methods of pláticas as an extension of a particular way of knowing (Fierros & Delgado Bernal, 2016). Pláticas have been used by various researchers in educational research with Latinx youth and Latina mothers (Gonzalez & Portillos, 2012; Guzmán, 2012). Pláticas were chosen over traditional interviews because pláticas respect participants as knowledge holders and draw from the everyday lives of students of color. Pláticas are an appropriate method to use because this study is on the Latinx students, emphasizes the relationship building between researcher and participants, which requires reciprocity and mutuality (Fierros & Delgado Bernal, 2016).

The pláticas were semi-structured and two pláticas were conducted with each participant, (1 hour average). A total of forty eight pláticas are included in this study. Each pláticas was recorded and transcribed verbatim. The first plática focused on relationship building between the researcher and participant, explanation of the project and learning about participant's family and education background. The second plática focused on participants' experiences in premedical studies and motivations to pursue medicine. As the plática is meant to create a space for vulnerability, I shared my experiences and struggles as a first-generation student in Sol University. The pláticas allowed students to explore, unexplored topics that are important in their career trajectory. In addition, observations and document review were conducted to provide triangulation of findings. The observation sites were selected due to the role of student organizations and non-curricular have been identified in the literature as key contributors to persistence of Latinx STEM students. Since many in-person activities were canceled during 2020 due to COVID-19 pandemic, I made an inventory of planned observations that were converted to

virtual online events for Latinx premedical students to track online activities and themes of meetings. Documents were collected from student organization websites and campus resources websites such as social media event announcements, newsletters and flyers.

Also, virtual observations were conducted during the new Latinx Premed initiative – Latinx Premed Scholars Program, which were a total of 10 sessions on various topics such as medical school workshop sessions and academic premed workshops. Observation protocol explores the purpose of the meeting, discussion and materials used. During the observations, I had a double role, as researcher and facilitator leading the sessions. Due to my double role, I relied on my notes during the session and journaling after each session to capture key discussion and items that related to Latinx student persistence.

Analysis

All pláticas were transcribed and members checks were conducted with participants. The qualitative software, Nvivo, was used for coding and development of themes. This study uses grounded approach for the analysis of data that is driven by a Chicana/Latina Feminist Epistemology. I employed the notion of 'cultural intuition,' which is the Latina researcher bringing their professional and personal experience into the research process and analysis (Delgado Bernal, 1998). My cultural intuition guided my pláticas with the students and my follow up questions. Memos were written during the entire process of the study, I wrote memos after a plática to make sense of emerging themes and while analyzing codes (Strauss & Corbin, 2007). Also, individual case reports were written for each participant in order to conduct cross-case analysis. Case reports allowed comparison and contrast of females, transfers, and students with different majors. I began with open coding which allowed me to write down categories, and I was able to explore my notes and identify descriptive, in vivo, process and

emotion codes (Emerson, 2011). Initial codes were created based on Rendón et al. (2019) cultural assets of Latinx STEM students, 'giving back'. Additional coding was done for the following assets of familial and lingual. I completed a second cycle of coding to refine and combine some of the first round of codes. Lastly, a codebook was created and guided by the literature of Latinx students in higher education.

Positionality Statement

My identity as a first-generation college student from a low-income family background has shaped my educational beliefs. I have dedicated my professional career to support students of color access and retention in higher education. Also, I am an alumna of Sol University and professional staff member of the medical school located in Sol University. I report my positionality because my identity and experiences impact my research design approach, frame the study, analytical techniques and report findings. I use the concept of 'cultural intuition' by Delgado Bernal (1998) that recognizes the Chicana/Latina scholars bring with them their personal and professional experiences as a strength to the research process. I bring with me my professional experience of working with Latinx premed students for over 10 years from high school to medical school. Through this time, I have gained insight to the obstacles that Latinx premed experience as they pursue medical school. Also, reciprocity is centered in my research engagement with the student participants. As a Latina conducting research with Latinx students, I aim to have 'buena voluntad' which means I care about the well-being of the participants and Latinx community from this research. Lastly, because of my close affinity to the campus, theoretical frameworks will guide my study and experts will be consulted along the way to reduce any potential bias.

Findings

Findings reveal 'giving back' as central in Latinx premed student's aspirations to pursue medicine. My findings also reveal the centrality of addressing Latinx health inequities when referring to 'giving back'. Thus, my findings reveal four ways Latinx premedical students use the cultural asset and knowledge of 'giving back' to address health inequities in their future careers as physicians. The four ways to 'give back' are 1) Giving back through Spanish language skills to address language barriers, 2) Giving back through volunteering in Latinx communities, 3) Giving back by creating infrastructure for Latinx premed students, 4) Giving back to underserved communities in future medical practice. This paper centers the analysis of the cultural asset of 'giving back', nonetheless throughout the paper, I also include the full narratives of the student's families and communities that are pivotal in student's conceptualization of 'giving back' (López et al., 2019; Rincón et al., 2020; Herrera & Kovats, 2022). Furthermore, the research on Latinx STEM students has focused on the attrition of Latinx students in STEM, however I find that first-generation Latinx premeds students are persisting by envisioning meaningful careers for themselves that are inclusive of their cultural background, families, communities and addressing health inequities.

Giving back through Spanish language skills to address language barriers

The Latinx first-generation premedical students strongly discussed their future plans to use the Spanish language in their future careers as physicians. The majority of all the student participants are bilingual (English and Spanish) and grew up listening or speaking Spanish at home with their Spanish-speaking parents and families. Additionally, during the pláticas with the students about Spanish, students included their familial experiences with the healthcare system. For instance, many of the students had negative experiences growing up with the healthcare field

that centered on language barriers, including having to take on the role as translators for their Spanish speaking parents and grandparents during clinical encounters with non-Spanish speaking physicians. For instance, Sara is a Latinx premedical student, she grew up in both Mexico and the United States with her parents. She was raised in a large urban city in California. Her interest in medicine was sparked by her community and familial experiences with the health care system. Sara describes her experience translating with her family, "I saw the language barrier that there was and I remember that growing up, I've always had to translate documents. Even though I was ten years old, I had to translate all these documents [for] my mom or like healthcare papers." Sara's experiences as a translator for her mom, made her aware of the language barrier that exists within the healthcare system for members from the Latinx community that only speak Spanish. Sara shares, "being able to help a lot of Latinx people that are struggling with that [language], would be something that I strive to do." Sara is beginning to imagine her role in the future as a physician addressing the language barrier and language needs of the Latinx community that speaks Spanish.

Next, is Ana a Mexican-American, recently graduated in Public Health and bilingual, English/Spanish. Ana shares her thoughts about her language skills,

> I'm bilingual and I think it's a gift. It's a gift living in San Diego. It's a gift living among so many Latino communities. It's something that's needed and not just, you know for Latino, you need representation like in your Physicians for everyone, right? So I think it's really, really important for me to be able to speak the same language as my patients and using my Spanish and my ability to understand, [the] Latino culture better. Something that can help facilitate the health of other patients.

Ana recognizes her Spanish speaking skills as a highly necessary skill that is important for communication and in a predominantly Spanish speaking community. Ana also brings up the importance of providing language concordant care to her future patients, that is when a physician is able to provide care in the same language as the patient. Language concordant care is

important as it relates to better health outcomes and patient satisfaction (Fernandez et al., 2011). In the state of California this is important because California has a multilingual community with the highest Spanish speaking population, with Spanish being one of the most under-represented language groups in California's physician workforce (Martinez et al., 2019).

In addition, Janet is a recent graduate that majored in Public health and minored in Biology and she shares her future plans to incorporate her Spanish skills into her practice. During her undergraduate years, Janet was a volunteer as a Spanish translator for a Student-Run Free Clinic and describes her role as a bridge, "we're [here] to serve as a bridge like cultural and communication." Janet's time as a volunteer was a crucial experience for her awareness of the need of bilingual physicians that communicate in Spanish, understand the Latinx culture and her potential role to fill this gap in the medical field. Janet shares, "being that bridge, because I always felt that you know, I've heard from other people who just have experiences where they don't know what the physician is talking about and that's scary. So I think that being there and kind of being in those spaces where I could make a little bit of a difference just with language. When you feel like maybe in the future I can provide better healthcare." Janet's translating experiences in Spanish, has led her to realize that speaking Spanish is an asset and needed in healthcare. Janet is able to connect that speaking a different language will allow her to make a difference in monolingual Spanish patient's lives and impact the field of medicine. Lastly, Janet finishes our pláticas by stating, "I hope that I can use those skills, language skills, to close that gap between physicians and the community." Janet is aware of her language skill set as an asset and the potential of using her language Spanish skills in her future careers as a physician. Additionally, Janet is envisioning her use of Spanish skills as not only translating services, but bridging physicians and the Spanish speaking Latinx community, by creating trusting

relationships within medicine. Thus, Janet plans to 'give back' through her use of Spanish language skills and through her service to address language barriers.

Additionally, Luis is a Human Biology major that recently graduated from college, also experienced translating for his father when he was younger. Luis plans to use his Spanish skills in his future practice and sees a role for himself in alleviating language barriers. Luis shares that he plans to use his Spanish skills to help communities that look like his dad, monolingual Spanish speaking. Luis shares, "I feel that I could break this communication barrier with doctors and help people like my parents that are Spanish speaking and have trouble speaking English or understanding English." During my pláticas with Luis, he clarified that he intends to go beyond solely providing translational services in Spanish and address stigma in medicine for Latinx communities. In the pláticas, Luis expanded that speaking Spanish in medicine is addressing communication barriers that will help improve health outcomes of Latinx communities, thus addressing health inequities.

Also, Alex is a Latino student from a large urban community, and he majored in Biology. Alex grew up in a Spanish speaking household and recalls going to multiple clinics when he was younger, due to his brother's health conditions. During Alex's family visit to the doctors, he would serve as the main translator between his family and the physician. Alex plans to use his Spanish skills in his future career, but also address the larger Spanish language barriers in medicine. For instance, Alex shares his ideas on giving back through Spanish, "host clinics or..find people that can teach basic medical terminology in Spanish to people or hospital groups. Or at the very least like in [the] emergency room, because that's where I had the most...exposure to where I see the language disparity…so…maybe [a] seminar." Alex has had experience working in the Emergency Department and has been able to recognize the need for not only

Spanish speaking physicians, but the need for overall implementation of Medical Spanish curriculum in the field of medicine and in medical departments with high interactions with the Spanish speaking patients, such as the Emergency Department.

Thus, due to the student's knowledge, lived experiences as translators and awareness of the need of Spanish speaking physicians, they plan to 'give back' through their Spanish language skills in their future careers as physicians. The concept of 'giving back', providing service in Spanish, is not only a translation service, but also a means to begin to address health inequities, specifically the language barriers in the field of medicine and the need for language-concordant care.

Giving back through volunteering in Latinx communities

The majority of the Latinx premed students plan to 'give back' in their future careers by providing service as volunteers in educational, outreach, local community clinics and clinics in international Latinx countries, such as Tijuana, Mexico. The Latinx first-generation students are beginning to conceptualize 'giving back' in their future careers through time outside of their careers as physicians. This is the beginning of Latinx student's re-imagining their future careers as physicians that is inclusive of 'giving back' through volunteering their time in various community projects. Additionally, many of the students grew up in low-income, diverse and predominantly Latinx communities during their childhoods and these lived experiences have informed their potential role as physicians in the future. Student's familial experiences growing up influences the communities that they are interested in volunteering with in the future.

One of the main examples of 'giving back' is through service as a volunteer for Latinx communities. The students mentioned multiple times being of service and giving back their time for Latinx communities. Various students have volunteered during their undergraduate years in

the Student Run Free Clinic, this is a local free clinic sponsored by the medical school that provides clinical services to undocumented community, mostly Latinx communities in the San Diego, CA region. Ana has been a volunteer for the Student Run Free Clinic for a year and shares, "even continue working as a volunteer at the Free Clinic. I imagine myself in future years being an attending there…volunteering my time. I really enjoy that." Through Ana's time at the Student-Run Free Clinic, she has been able to witness various physicians that volunteer their time and this is something that she wants to be able to do in the future, practice medicine and volunteer her time.

Similarly, Jorge, a Mexican-American, Physiology & Neuroscience major and Global Health minor, recently graduated and was involved with an international Student-Run Free Clinic, located in Tijuana, Mexico. Jorge regularly volunteered on the weekends, during his undergraduate years, along with other undergraduates and physician volunteers. In the future, Jorge has plans to 'give back' by volunteering with international organizations. Jorge shares, "I want to reach out… through my own organization, through another organization like Partners in Health, Doctors without Borders. Something that could help my own community and give them back [because] it's not really fair that certain populations are just suffering because [resources] are not being well redistributed." Jorge identifies two international organizations that work with health care professionals to provide health services to low-income Mexican communities. Through my pláticas with Jorge, I learned that Jorge grew up attending a low-resource hospital and through his coursework in his minor in Global Health, he has learned about racial/ethnic disparities in accessing health resources. Thus, Jorge plans to 'give back' through volunteering his time to connect with international health organizations to improve health inequities, by addressing health access and health resources in his Latinx community.

Furthermore, Diana shares her plans to 'give back' by going out to communities with Latinx people. Diana is the president of a Latinx premed student organization and has experience in participating in various community health outreach events. Diana shares that she plans to, "give back doing a lot of educational outreach, whether it be at clinics or physically going to the fields*."* Diana describes some of the volunteering that she has previously done, "talk[s] about diabetes, high cholesterol," these are health and educational informative sessions that Diana participated in the past. Diana also shares, "so I think having those, being accessible to them [Latinx communities], not just in the clinics, but also going to the fields, going to Home Depot, talking to the day laborers…like really putting myself where they are." Diana's plans to 'give back' are through her time to a specific Latinx community and specific locations, that are non-clinics, that have high numbers of Latinx people with high need for healthcare. For instance, Ana mentions the day laborers in Home Depot, whom are usually undocumented workers. Undocumented communities have little to no access to health insurance and health resources (Cabral & Cuevas, 2022). Thus, Ana is thinking about accessibility issues for Latinx communities and by 'giving back' she plans to volunteer her time to provide health services directly to the Latinx undocumented communities that have limited access to health care.

Thus, the Latinx first-generation premeds' plans to 'give back' involves giving of their time outside of their medical practice to volunteer in various organizations that serve Latinx communities and going directly to bring health care services to Latinx communities. The volunteering involves health education, medical services and creating partnerships outside of the traditional hospitals/clinics and into Latinx communities.

Giving back by creating infrastructure for Latinx premed students

As I continued the pláticas with the students and they elaborated on their ways to 'give back,' an emerging theme was 'giving back' to future premeds through creating infrastructure to provide financial, clinical exposure and positivity. A common way of 'giving back' is usually through STEM mentorship by Latinx STEM students (Rendón et al., 2019). However, 'giving back' through mentorship was not explicitly mentioned by the students and I will further explain how this theme lacks mentorship.

One of the ways students plan to 'give back' was through creating financial scholarships for Latinx premeds. Diana, a Mexican-American, third year student, double majored in Human Biology and Global Health. Diana grew up in a low-income household with various documented and undocumented family members. During the Latinx Premed Sessions, Diana was the first students to sign up for fee waivers for medical school, which allows students to apply at a free and reduced fee per application. Diana shared with the other participants of the program the financial benefits of the fee waiver program for medical school. Additionally, Diana shares her future plans as a physician, "When I'm a doctor, I want to have scholarships available. I want to work on both aspects, the location and also the future of medicine. So when it comes to the future of medicine, I want to have scholarships available specifically for undocumented students or black student, for Latinx students [and] for Native American students." Diana's family experiences with immigration and lack of financial resources has instilled in Diana an understanding of the importance and limitations of funding opportunities in her own trajectory into medicine. There are less than ten scholarships nationwide that are aimed at Latinx premedical students. Thus, Diana is thinking of structurally addressing health inequities, the

future of medicine, by focusing on the financial structures, such as scholarships that are needed to support a diverse physician workforce.

As I continued the plática with Diana, she kept going back to discuss Latinx premed students. Diana had previously interned at an international Student-Run Free Clinic in the Tijuana border region and had gained experience working with physicians and undergraduate student leaders with Mexican Spanish speaking communities. Diana shares, "if I do open clinics….incorporate undergrad students in units and they go on rotation and they can help run the clinic. So that can give [undergraduates] exposure and have them really build on their interest. At the same time they can shadow doctors at those clinics." Diana brings up two important factors for many premedical students when applying to medical school, requirements of clinical exposure and clinical shadowing. Clinical exposure is important for premed students because premeds need to demonstrate to Admissions Committees that they are familiar with clinical settings and clinical personnel. Also, clinical shadowing is a requirement for premedical students that are applying to medical school. Premedical students are required to complete a minimum of 100 hours in order to demonstrate understanding of a physician's clinical day. However, access to clinics and physicians is very difficult for many premedical students, especially first-generation students that do not have immediate family members that are physicians. Many first-generation premedical students rely on special hospital programs that have clinical opportunities embedded into the program. Thus, Diana plans to 'give back' by creating clinics that will have infrastructure for premedical students to gain clinical exposure and clinical shadowing. Diana's plans are to address access for first-generation premedical students by creating infrastructure access to clinics and physicians.

Lastly, the opportunities mentioned above are specific ways of 'giving back' to premeds, however, an often way to 'give back' is through mentorship in STEM during undergraduate (Rendón et al., 2019). However, the Latinx premed students hardly mention 'giving back' through mentorship. Many of the premed students understood the importance of mentorship in their future careers, however, only one student brought up assisting a premed through positivity. Juvenal is a transfer student that has faced various academic barriers, such as unsupportive advising and encountering academic challenges in STEM courses. When Juvenal discussed 'giving back', he focused on bringing positivity. Juvenal shares, "I don't know how to even explain it….what I want to bring, that attitude and that kind of positivity to my future if I can change one person and get them out of that life and steer them in the right way and have them later on email me, hey you changed my life, I know I did something good, that's really what I want to do." During my second plática with Juvenal, he again mentioned positivity and how important it is to surround oneself with groups that are positive, from faculty to students. He owed his own success to many positive experiences he had during his community college years. The positivity that Juvenal brings up refers to creating a positive supportive environment and this positivity is against the backdrop of the Sol University's campus culture that is a competitive STEM environment. An institution like Sol University, a research one campus and level of selectivity has been shown to impact URM students retention in STEM (Chang, Cerna, Han, & Saenz, 2008; Chang Sharkness, Hurtado & Newman, 2014). Juvenal, along with many of the Latinx premed participants, didn't receive any formal faculty mentorship, thus, as a first-generation student, it may be difficult to imagine 'giving back' through formal mentorship, but instead through the need for positivity in the STEM learning environment. Addressing the STEM learning environment is part of the structural issues that includes racial campus climate and

microaggressions in a STEM environment that has traditionally marginalized Students of Color (Chang et al., 2011, Garcia & Hurtado, 2011).

Thus, Latinx first-generation premeds aim to 'give back' by creating infrastructure that will assist premed students in moving forward toward medical school. The infrastructure, such as scholarships and clinical shadowing, are rare and difficult to find for first-generation students. While the campus infrastructure, made up of a competitive STEM climate, is challenging for Latinx students that come from collectivist backgrounds and enter competitive STEM environments (Seymour and Hewitt, 1997; Hurtado et al., 2009). Collectively, these forms of 'giving back' will create infrastructure for Latinx premed students pursuing medical school.

Giving back to underserved communities in future medical practice

The majority of the Latinx premedical students are interested in giving back to underserved communities through their future careers as practicing physicians. A variety of locations and underserved communities are mentioned by the Latinx premeds as they envision their future practice in medicine. Some of the locations are their home communities, rural, urban, low-income communities and Spanish-speaking communities. Also, the Latinx premedical students name their future patients as being part of marginalized racial/ethnic communities and low socio-economic status.

First, many of the Latinx premed students plan to 'give back' to their home communities by practicing medicine in their hometowns. For instance, Sara, who grew up in both Tijuana, Mexico and California, has strong ties to her local community in Tijuana. Sara explains her future plans that are related to her community of Tijuana, "Tijuana raised me, so I feel like I have to give back some of my [knowledge], now that I have this knowledge…. I can give back to my community. I think that really makes me want to go back and give some of my experience."

Sara's desire to 'give back' to her home community is driven by a sense of responsibility. A responsibility to go back and 'give back' the newly acquired knowledge of medicine. Sara has specific plans for the newly gained knowledge, she plans to apply her newly gained knowledge to her hometown community. Additionally, Sara brings up 'going back' to her hometown. The majority of the Latinx premed students (non-transfers) have left their hometowns to pursue higher education. Thus, 'giving back' goes along with going back to home communities. A return to hometown is a practice that other professional graduate students have engaged in, such as graduate PhD scholars returning to their hometowns to apply knowledge gain in PhD programs (Reyes et al., 2020).

Additionally, Cynthia shares her interest in 'giving back' to her hometown, a rural Latinx community. Cynthia grew up in a rural Latinx community, located in Central California that is made up of Mexican farmworker families. Cynthia shares, "I want to go to work in the central valley, which is like very rural. There's a lot of farm workers [that] speak Spanish. I think that would be my ideal population to be able to serve." Similar to Sara, Cynthia also plans to return to her hometown, to practice medicine in her rural hometown. A return to hometowns is also connected to student's understanding of their local community needs, such as the limited health resources in Central California. For instance, Cynthia describes her rural hometown as having many Spanish speaking farm workers. Farmworkers face many health inequities due to access, work and immigration status (Hu et al., 2016). Thus, Cynthia's desire to return to her hometown to serve as a physician is motivated to address various health inequities that Spanish speaking farmworkers experience in her rural hometown.

Lastly, collectively the students want to give back through their future practice to diverse underserved communities. Some of the examples of underserved communities mentioned are

low-income, homeless, LGBT and Black communities. For instance, Diana shares her interest in becoming a pediatrician and serving, "low-income communities like family health centers or places where they accept Medi-Cal*."* Diana specifically names the 'family health centers' which are Federally qualified health centers (FQHC) that serve racial/ethnic, low-income communities and Medi-Cal patients, which are low-income families in California. In California, there is a high need for physicians in FQHC as they serve diverse, multilingual and low income families throughout the state of California (California Health Care Foundation, 2021). Also, Jessica, Mexican-American, recently graduated as a Human Biology major, shares her future plan, "I want to work for people who are minorities and have a low socioeconomic status because…having financial instabilities was something that I struggled with." Jessica's desire to 'give back' is related to her own family financial struggles and growing up in a low-income community. Now that Jessica is on her path to medical school, she is envisioning her future patients and she plans to serve patients that have a similar background as herself. Thus, 'giving back' for these future Latinx first-generation physicians, is specific to underserved communities.

Lastly, Daniel, recently graduated with a major in Molecular Biology and plans to 'give back' alongside his future profession as a physician. During the pláticas with Daniel, he shared his background as a transfer student from a predominantly Latinx community. Daniel was involved in health policy and educational outreach when he was enrolled in community college. Daniel shared his reasons for being a premed, "I'm really in it to do the work for a community. I want to do work with the underserved." For Daniel, serving underserved communities in his future he added that "I want to do work that is service-based….something [to] improve my community." Thus, Daniel's service is to 'give back' to underserved communities in his future

career and address health inequities. Daniel includes that he wants to improve the underserved community which is related to improving health outcomes of the underserved communities.

Discussion

The aim of this paper is to examine in-depth the Latinx cultural asset of 'giving back' and its relationship to aspirations and persistence of Latinx first-generation premeds. The various ways that Latinx premeds conceptualize and imagine their future, provides a glimpse into Latinx first-generation premed students' priorities when pursuing medicine. These priorities are important because 'giving back' matters to the Latinx first-generation students and understanding how Latinx first-generation students conceptualize 'giving back' will allow educators to appropriately support Latinx first-generation premeds in the premed pathway. Additionally, the ways of 'giving back' are important because they are connected to Latinx families and Latinx communities. Below, I will discuss the important role of "giving back" cultural assets and knowledge and how "giving back" can be leveraged to support students retention and persistence in Latinx students' pursuit of medicine. I introduce a conceptual model of aspirations of Latinx first-generation premeds. Lastly, I end this paper with a call to re-imagine premedical pathways, recruitment and admissions for medical school and STEM curriculum to center Latinx student's cultural asset of 'giving back'.

Latinx students' lived experiences and knowledge guides 'giving back'

Central to the pláticas that I had with the students was the constant connection to their lived experiences with their families and communities. Grounding in family and community has been shown as key for Latinx STEM students that are interested in improving their communities (Herrera & Kovats, 2022). Some items Latinx students shared was their negative experiences with the healthcare system, including discrimination, culture and language barriers. For language

barriers, students grew up translating for their family members and interacting with various non-Spanish speaking physicians. Previous research has shown the stressors for children of immigrants that take on the responsibility of brokering (translating documents for parents), especially with the added pressure of major health issues (Dorner, Orellana, & Jiménez, 2008; Orellana & García, 2014). These brokering experiences were critical for the Latinx student's development of their awareness and knowledge of health inequities, such as language barriers and language-concordant care in medicine. Students have knowledge of language barriers in medicine and awareness of the importance of Spanish speaking physicians in a clinical encounter with Latinx patients. These lived experiences are the beginning of the Latinx student's personal development of cultural competency. Cultural competency is the use of knowledge about individuals and groups of people and ability to interact with people and use cultural practices to meet health outcomes (Pope-Davis & Donald, 1996). Cultural competence includes language competence, which is providing language services orally and written language services to people with limited-English proficiency. Language competence can be provided through translators, bilingual staff and physicians. The Latinx premed students witnessed a lack of Spanish speaking physicians and the impact of the lack of culturally competent physicians with their families. The lived experiences of the Latinx premed students guided the students towards filling in these gaps, by becoming the bilingual and bicultural physicians their community needs. My findings reveal the critical knowledge of Latinx students from their lived experiences guiding their aspirations to 'give back' by addressing health inequities.

Additionally, many of the participants referred to their future self, as having acquired knowledge and 'giving back' the newly acquired knowledge. This notion of sharing the newly acquired knowledge is a reflection of the collectivist attitude of the Latinx students. Latinx

communities hold collectivist attitudes, such as sharing responsibility and centering family, familismo (Cox et al., 1991; López et al., 2019). These collectivist attitudes are in contrast to individualistic orientation, which the United States and STEM field are more widely known to hold. Thus, the sharing of knowledge is a reflection of Latinx student's sharing of their future privilege that they will hold as physicians. Thus, the lived experiences and knowledge of Latinx premed students guide the way to 'give back'.

Career aspirations of Latinx first-generation premeds are related to 'giving back'

The participants in this study all have high interest in pursuing medical school. These students are juniors, seniors and recently graduated and plan to apply to medical school in one to two years. As mentioned above, the lived experiences and knowledge guides these students in their pursuits of STEM and their premed pathway. However, a unique finding is that the participants' aspirations are related to community needs. A community's needs, such as a need for bilingual physicians that speak Spanish and a need for physicians because of the physicians shortage in rural communities, Latinx communities and low-income communities. For example, Alexa, who grew up in a rural and farming working community, her aspirations are to 'give back' to her hometown because of her hometown's need of bilingual and bicultural physicians.

Thus, I argue that the aspirations of the Latinx first-generation premeds are related to 'giving back' to underserved communities, see figure 1. The students are very specific on their 'why' in pursuing medicine. Such as, providing specific ways of 'giving back' within and outside their careers as future physicians. Also, the students are specific in the communities and patients that they want to serve in the future, many stated to serve Latinx communities, in urban, rural, and low-income communities. As students begin to imagine their future careers, as first-generation college students, they are re-imagining the traditional notions of duties of physicians

and re-imagining ‘giving back’ alongside and within their careers as physicians. Thus, many of these students are pursuing medicine with high aspirations to enter medical school and driven by a mission to ‘give back’. Below, I introduce a model of aspirations that is related to ‘giving back’ to understand the critical role of Latinx students' knowledge and lived experience and centering of ‘giving back’ to underserved communities.

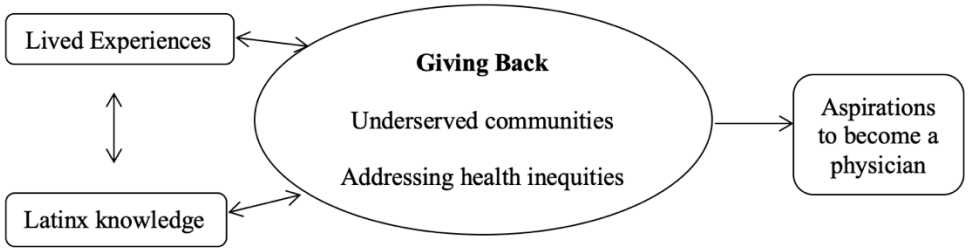

Figure 4.1: Conceptual Model: Aspirations of Latinx first-generation premedical students

This conceptual model is important because it provides insights into career aspirations, to become a physician. The model begins with the Latinx student’s lived experiences and knowledge informing one another and vice versa. Then the lived experiences and Latinx knowledge guide towards ‘giving back.’ The model centers on 'giving back,’ which is inclusive of giving back to specific underserved communities and addressing health inequities. ‘Giving back’ then guides aspirations to become a physician. This model extends the ‘giving back’ asset from STEM education, such as Rendón et al., (2019) Latinx STEM students giving back to address STEM inequities and McGee and Bentley (2017) equity ethic of Latinx and Black STEM students, working with marginalized communities. This paper has provided a glimpse into the ways that Latinx students are planning to ‘give back’ in their future careers. By understanding how Latinx students are formulating their aspirations, then institutions of higher education,

STEM departments and medical school can better align their levels of support. Next, I provide practical recommendations for higher education scholars in order to ensure Latinx first-generation premedical students with high aspirations for medical school, continue through the premedical pathway.

Recommendations for institutions of higher education

1. *Re-imaging premed pathways that center 'giving back' and bring you home.*

Traditional premed pathways have a heavy emphasis on academic measures, research and clinical shadowing hours. However, institutions of higher education need to recognize that Latinx first-generation students are motivated by the health inequities of their home communities and thus must include community service, community engagement and community based-research as critical components of entering medical school. Also, pathways to medical school are traditionally understood as a linear process that begins in undergraduate to medical school and then residency to completion as a physician. However, this paper highlights the critical role of Latinx first-generation students who desire to return back home to their hometowns to serve. Thus, reimagining pathways that begin with Latinx students and their families, goes through undergraduate study and returns home for medical school or residency, in order to begin their careers as physicians in their hometowns.

2) *Re-imaging recruitment strategies for medical school admissions*

Latinx premed first-generation students are persisting through their premed journey and they are mission-driven to serve underserved communities. However, Latinx medical students continue to remain underrepresented in medical school, with 6% of matriculating Latinx students into a US medical school in 2018-2019 (AAMC, 2019). Thus, traditional recruitment strategies need to change in order to attract Latinx students. Traditional recruitment strategies include

boasting medical school standings, such as US News rankings, top departments and research productivity. Instead, recruitment strategies can highlight community engagement with diverse and underserved populations. Additionally, targeted recruitment of Latinx students through the creation of pathways programs that center on culture and 'giving back'.

3) *Re-imaging medical school admission processes to address physician workforce needs*

Nationwide there is a physician shortage in primary care and physicians to practice in low-access resource communities, which includes many rural and low-income Latinx communities. The Latinx first-generation premed students have a high level of interest and commitment to 'give back' and serve underserved communities. Additionally, many plan to go back to communities that are part of the federally qualified centers. Thus, medical school admissions must review their admissions process to be inclusive of students that plan to enter primary care and serve underserved communities. An examination of admissions processes that heavily weighs academic measures must go beyond holistic review and addressing physician workforce needs

4) *Leveraging 'giving back' assets into STEM curriculum*

Institutions of higher education must be prepared to embrace Latinx students cultural assets and recognize the knowledge from Latinx students bring to higher education, along with their lived experiences. To embrace the cultural asset of 'giving back', educators must recognize that Latinx students are entering the STEM environment with a deep understanding of health care disparities and aspire to 'give back' through their future careers as physicians. Topics such as centering underserved communities and STEM, must be addressed in the curriculum in order to retain and support Latinx student persistence in STEM courses. A few examples of

incorporating communities into STEM are through service-learning courses (Marrun, 2018 & Collins et al., 2020)

Conclusion

With the growth of Latinx students on campuses and continued increase of emerging-HSIs nationwide, we must begin to focus on the cultural assets of Latinx students and how these cultural assets contribute to the persistence of Latinx students in higher education. Emerging-HSIs can play a critical role in supporting Latinx first-generation. For instance, as emerging HSIs and HSIs become Latinx responsive, by centering Latinx students and focusing on inequities of Latinx students in higher education (Contreras, 2019) a culturally-relevant approach is needed to support Latinx first-generation premeds. The graduate pathway to medical school, must be culturally-relevant and be inclusive of the cultural asset of 'giving back.'

Additionally, for Latinx first-generation premed students, the 'giving back' asset was central to their aspirations of becoming a physician. Thus, the various cultural assets need further examination within STEM as these cultural assets are not just cultural strengths but impact student's aspirations. Moreover, the 'giving back' asset was more than service, but included addressing health inequities to improve health outcomes of Latinx communities. These are unique findings that are specific to the Latinx first-generation premeds in STEM. The Latinx premeds are navigating their undergraduate years within the STEM environment and need attention to their unique needs and priorities. Thus, adopting a culturally-relevant approach will ensure the support of bilingual and bicultural Latinx first-generation physicians.

Acknowledgement

Chapter 4, in part is currently being prepared for submission for publication of the material. Katherine Arias Garcia was the primary researcher and sole author of this material.

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Appendix 4A

Table 4.1

Participants demographics, majors and minors

Name	Gender	Age	Ethnicity	Major	Minor
Salvador	M	21	Mexican-American	Global Health	
Cynthia	F	23	Mexican-American	Human Biology	Psychology
Hector	M	26	Mexican-American	Physiology and Neuroscience	
Janet	F	23	Mexican-American	Public Health	Biology
Silvia	F	20	Mexican-American	Global Health	Biology
Alex	M	21	Latino (mixed, Mexican, Chilean, German)	General Biology	
Valerie	F	21	Mexican, Chicano	Physiology and Neuroscience	Global Health
Diana	F	21	Mexican-American	Human Biology and Global Health	
Edgar	M	25	Mexican-American	Public Health	Biology
Juvenal	M	31	Mexican	Human Biology	
Sara	F	20	Mexican-American	Human Biology	
Jorge	M	21	Mexican-American	Physiology and Neuroscience	Global Health
Ana	F	25	Mexican-American	Public Health	Psychology
Luis	M	24	Latino	Human Biology	
Sabrina	F	28	Mexican-American	Public Health & Ethnic Studies	
Isabelle	F	24	Mexican-American	Human Biology	Global Health
Jessica	F		Mexican-American	Human Biology	
Daniel	M	29	Latino (Cuban)	Molecular Biology	
Grisel	F		Mexican	General Biology	
Judith	F	22	Mexican-American	Physiology and Neuroscience	
Ana	F		Mexican-American	Public Health	
Aliza	F	22	Mexican	Human Biology	
Kyle	M	24	Mexican	Nanoengineering	General Biology
Armando	M	23	Mexican	Physiology and Neuroscience	

CHAPTER 5

Conclusion and Implications

This study aimed to examine Latinx cultural assets of premed students through an asset-based lens that views Latinx culture as an asset. By examining cultural assets, this dissertation provides insights to what is important for Latinx first-generation premed students as they navigate and persist the premed pathway during their undergraduate years. Cultural assets have been shown to be critical in the persistence of Latinx students in STEM (Rincón & Rodriguez, 2021; Samuelson & Litzler, 2016). Thus, identifying cultural assets is important to gain insight on retention and persistence of Latinx students in premed studies. I conducted two rounds of pláticas with 24 Latinx premed students. Additionally, I conducted observations during the Latinx Premed initiative and content review of websites and premed activities on the campus. The pláticas focused on students' motivations to pursue medicine, persistence during their undergraduate years and their college experiences.

Summary of Findings

The overarching research questions are listed below. I will briefly summarize the research findings that each article addressed and how they addressed the overarching research questions.

R1) Are there unique *ventajas*/assets and *conocimientos*/knowledge that Latinx premeds use in their pursuit of premed studies? How do these *ventajas*/assets and *conocimientos*/knowledge contribute to persistence of Latinx students in premed studies?

R2) How does the *ventaja*/asset of giving back relate to the field of medicine?

Chapter 2 focuses on the qualitative methodological tool of pláticas methodology and its application to STEM education with Latinx students. As STEM education continues to address inequities amongst diverse students, new methodological tools are needed in order to advance

STEM education research. In this chapter, I address traditional methodological in STEM education, epistemological approach within STEM education and introduce Chicana/Latina Feminist Epistemology and pláticas methodology. I examine the strengths of pláticas methodology, such as, view and honor participants as co-constructors of knowledge, incorporate everyday lived experiences as part of research inquiry, a potential healing space for Latinx student and based on reciprocity, vulnerability, researcher reflexivity and draw heavily from Chicana/Latina feminist theory. This chapter hopes to center the voices and experiences of Latinx students in STEM and Latinx researchers to continue to advance theoretical frameworks of Latinx STEM students that are inclusive of Latinx students.

Chapter 3 examines the cultural assets that Latinx students employed during the COVID-19 pandemic. This dissertation was conducted during a unique time when a global pandemic impacted all students and an educational shift to a virtual setting. Findings reveal that Latinx students were persisting in their premed studies in the face of a global pandemic and making connections to larger structural issues that impact Latinx health outcomes. More specifically, the navigational asset and resistant asset were pivotal during this time as students were navigating a shift to virtual education environment and multiple virtual interruptions in their premed trajectories. Lastly, the resistant asset allowed students to associate health disparities and their motivations to pursue medicine as health disparities in Latinx communities was at the forefront for many in their hometowns and families.

Lastly, Chapter 4 examined the critical role of "giving back" cultural asset for Latinx first-generation premed students from Rendon et al., (2019). Chapter 4 examined the cultural asset of 'giving back' and its relationship to medicine, such as influencing Latinx premed student's aspirations to becoming a physician. This chapter specifically addressed the second

overarching research question, "How does the *ventaja*/asset of giving back relate to the field of medicine? and included the following sub questions, "How do Latinx first-generation students operationalize 'giving back' and how does 'giving back' shape aspirations to pursue medical school?" Findings reveal the various ways that Latinx students conceptualize giving back in their future careers, such as through volunteering their time outside of clinical duties, creating infrastructure to support Latinx first-generation students, using their Spanish skills in their future practice and serving underserved communities. Additionally, findings illustrate the critical role of lived experiences and Latinx knowledge in informing 'giving back' and role of addressing health inequities embedded into ways of 'giving back.'

Revisiting Foundational Research

STEM education literature on retention and persistence of Students of Color has traditionally focused on Students of Color leaving the sciences (Seymour and Hewitt, 1997). Multiple researchers have documented the academic difficulties Students of Color encounter in early 'weeder courses,' such as chemistry, which cause Students of Color to depart from STEM (Alexander et al., 2009; Barr et al., 2008; Barr et al., 2010). Additionally, the STEM environment is known as a cold and unwelcoming environment for Students of Color (Seymour and Hewitt, 1997). However, in the past twenty years, STEM education research has begun to examine inequities in STEM by examining racial experiences of Students of Color in STEM (Hurtado et al., 2009; Chang et al., 2011; McGee, 2020). Additionally, the latest STEM education research on Latinx students has shifted in adoption of asset-based frameworks to uncover Latinx strengths in STEM (Rincón & Rodriguez, 2021; Rincón, Fernández & Dueñas, 2020; Gonzalez, Fernández & Wilson, 2020). My research expands STEM education research to include premeds in STEM and focus on first-generation Latinx students. STEM education

research has traditionally excluded students that are interested in medicine. However, the majority of premeds major in Human Biology and in this dissertation, the majority of the participants were Biology majors. Thus, my dissertation, contributes a more nuanced understanding of Latinx first-generation STEM students, by focusing on premeds and their aspirations and cultural assets as they persist towards becoming physicians.

Additionally, STEM education methodologies have centered quantitative measures and traditional academic measures of STEM student success. As the field adopts asset-based frameworks and continues to interrogate racism in STEM, the next step is to begin to use new methodological approaches that will advance to further understand culture and racism in STEM. My research continues this line of inquiry, by centering Latinx students in STEM through the use of Chicana/Latina Feminist Epistemology. My contribution is the introduction of pláticas methodology in STEM education, to engage Latinx students and their voices in STEM. Engagement with Latinx students goes beyond seeing Latinx students as research subjects but calls for a shift for faculty to begin to view Latinx students as knowledge holders.

Synthesized Implications: A Call to Action

Below I present implications that have been synthesized across the three articles. Implications are presented for research, practice and policy. Guiding the synthesis is a focus on transforming higher education in order to center Latinx students' experiences in higher education and a call for reconceptualization of postsecondary success for Latinx students. Thus, the implications challenge traditional notions of success, such as academic outcomes and are a call to action to educators, researchers and policymakers in education.

Implications for future research

Re-conceptualization 'giving back'

The literature uses a variety of definitions to describe the act of 'giving back' by students in higher education. Some examples of 'giving back' includes using one's education to give back to a community (Page-Reeves et al., 2019), giving back through service, volunteering, returning to hometowns and giving back financially to family members (McCallum, 2017; Storlie et al., 2016; Salis Reyes, 2019). The notion of 'giving back' is also related to concepts of reciprocity and students that come from collectivist backgrounds, such as Latinx and Native students (Brayboy et al., 2014; Guillory, 2009; Cox et al., 1991; López et al., 2019).

However, for Latinx students pursuing medicine, the concept of 'giving back' by Rendon et al., (2019) falls short. Rendon et al., (2019) describes 'giving back' as 1) providing service to Latinx community and the greater society and 2) addressing inequities and underrepresentation of Latinx in STEM. In chapter 4, I extend the concept of 'giving back' to include addressing health inequities. My findings reveal the ways that students conceptualize 'giving back' is grounded in addressing health inequities in underserved communities. The Latinx first-generation premeds in this study are very specific and resolute on the types of communities they plan to 'give back' to: underserved communities. Engagement in 'giving back' stems from Latinx students' lived experiences and knowledge. However, the lived experiences and knowledge, includes discrimination and bias with the health care system and situations of life and death of Latinx families and community members. Thus, 'giving back' requires re-conceptualization of the term 'giving back' in health professions to capture the health inequities that are embedded in 'giving back'. The concept may be expanded to include social justice consciousness, equity ethic and health equity (Rendón et al., 2019; McGee and Bentley, 2017).

Thus, I plan to continue expanding this line of research in a forthcoming article focusing on re-conceptualizing 'giving back' for Latinx first-generation premeds.

Call for a reconceptualization of postsecondary success for Latinx students to enact servingness and Latinx responsiveness in emerging HSIs and HSIs

This dissertation centered the cultural assets and knowledge of Latinx first-generation students. By centering Latinx student voices and experiences, we gained insight to the strengths and assets of students as they navigated being premeds in a research intensive university and during the COVID-19 pandemic. Two major findings are addressing health inequities through 'giving back' to underserved communities and making connections to the larger structural issues that impact Latinx health outcomes. These findings reveal the important role of Latinx communities in the career aspirations of Latinx first-generation premed students. Thus, to continue to center Latinx students, a reconceptualization of postsecondary success is needed that goes beyond academic measures and academic outcomes, but aligns with Latinx student's careers aspirations and inclusive of Latinx communities.

Future research must examine a reconceptualized postsecondary success of HSIs and emerging HSIs, as they have large growing Latinx student populations. Scholars have challenged the notions of HSIs and eHSIs as simply enrolling Latinx students, but must adopt a servingness approach to serve Latinx students (Garcia, Núñez & Sansone, 2019; Garcia, 2019). Additionally, Contreras (2019) introduced the concept of Latinx responsiveness in programing, curriculum and equity measures. Thus, further research is needed in responsiveness and servingness in HSI campuses and emerging-HSIs that serve a large number of Latinx students. For instance, how can HSIs provide culturally appropriate graduate pathways to reconceptualize postsecondary success? Ramirez & Rodriguez (2020) has highlighted the increased number of community

partnerships in HSIs. Also, Ramirez & Rodriguez (2020) findings point to the important role of community engaged partnerships in order to increase Latinx student participation in STEM in HSIs. Furthermore, Subbian et al., (2019) calls for attention to 'STEM servingness' in HSIs in order to advance and broaden Latinx student participation in STEM in HSIs. The findings from this research call on educators to center Latinx cultural assets and knowledge in STEM and these must be linked to postsecondary success.

Continued centering of Latinx students in STEM through platicas methodology

STEM education research is a field that is rapidly growing, especially in STEM teaching and learning with diverse students (Li et al., 2020). Many researchers are implementing curriculum and pedagogical changes in their STEM classrooms to increase retention and academic outcomes of diverse students. Additionally, the National Science Foundation created in 2017 a new Hispanic-Serving Institutions Program with focus on expanding participation of Latinx students in STEM. Thus, there are many opportunities for researchers, practitioners and students to engage with Latinx STEM education research. However, Latinx students' voices are still missing from STEM education research, with many quantitative and few research articles solely focusing on Latinx students. Thus, qualitative methods must be continued to be used in order to include the Latinx student experiences, especially first-generation Latinx students. Pláticas methodology is an innovative methodology that can be used with asset-based frameworks to center Latinx STEM students' cultural strengths in higher education. Also, through pláticas methodology, there is a potential shift to view Latinx students as knowledge holders and STEM scholars, versus deficit views as lagging behind in STEM. Thus, as students are seen as knowledge holders, then pláticas methodology has the potential to theory build with Latinx students (Fierros & Delgado Bernal, 2016). This is a new possibility to advance and

create new theoretical frameworks to advance STEM education research. Lastly, with pláticas methodology Latinx students go beyond participants and can develop on-going relationships with participants. This is a new possibility for Latinx students to co-create and provide input on the various curriculum changes occurring on campuses throughout the nation.

Implications for practice

Latinx students' cultural assets have not been fully embraced by institutions of higher education. Within STEM, there is a dominant culture of science, that is white and Eurocentric, with norms and values, such as, individualism and competition. While, Latinx students traditionally come from collectivist backgrounds and center familismo (Cox et al., 1991; López et al., 2019). When Latinx students enter STEM, they navigate a culture of whiteness and competition (Rincón, Fernández, & Dueñas, 2020; Seymour and Hewitt, 1997; Hurtado et al., 2009). First-generation college students have an additional challenge as they are the first from their families to enter higher education. However, my findings point towards Latinx student use of assets of navigation, familial, lingual and giving back as critical assets impacting their aspirations to pursue and persist in premedical studies. Thus, Latinx cultural assets must be included in higher education to increase persistence in premedical studies. Below are recommendations for practice.

Collaboration amongst Biology Department, Social Sciences and Medical School

To include Latinx students' cultural assets, institutions of higher education must be prepared to embrace Latinx students from the margins. Multiple departments need to examine their student demographics and first-generation Latinx students, as Latinx students are increasing nationwide. Collaboration is needed amongst departments with a large number of premedical students, such as Biology and Social Sciences. Also, Medical School – Medical Education

Departments must work collaboratively with the departments listed above to support Latinx students during their undergraduate career trajectory. Additionally, bridging STEM and Chicano/Latino Studies is also needed. Many of the student participants were Biology majors with Global Health minors. The campus lacks a Chicano/Latino Studies Major, but this is a potential area of growth at Sol University and many campuses. STEM departments must turn to and collaborate with the expertise of Chicano/a Latino Studies Major that focus on culture, labor and structural inequities, such as health inequities. Thus collaboration amongst STEM, Social Science departments and Medical Education, must occur to retain and support Latinx student persistence towards their medical dreams of becoming bicultural and bilingual physicians.

Leveraging Latinx cultural assets in the premedical curriculum

A potential place to begin collaboration is addressing the premedical curriculum. To embrace cultural assets, educators must recognize that Latinx students are entering the STEM environment with a deep understanding of health care disparities and cultural competency. Thus, the premed curriculum must go beyond sciences and include intersectionality of science, biology, public health and Chicano/Latino Studies courses to be inclusive of health disparities. Courses must be revamped and linked to real life issues, such as health inequities. By expanding on the linkages to health inequities, then Latinx first-generation students may be more engaged. Lastly, Medical Schools have influence in course requirements. Although, science courses are no longer requirements in many Medical Schools. Medical Schools can have a larger role by recommending Medical Spanish, Health Disparities and Social Determinants of Health for undergraduates, thus centering Latinx cultural assets in the premed curriculum.

Culturally-relevant graduate pathways for Latinx first-generation students

Lastly, traditional pathways to medicine must become responsive to Latinx first-generation students and their cultural assets. Thus, institutions of higher education must create meaningful culturally-relevant graduate pathways for Latinx first-generation students. For instance, the model of aspirations of Latinx first-generation premeds provides insights to the critical role of 'giving back' and aspirations of premeds. Thus, graduate pathways must go beyond meeting academic beachlines, but include Latinx cultural assets and embed Latinx community. Another example of a culturally relevant pathway is through Medical School's pipeline/pathways programs. At UC San Diego, the Latinx Premed Pathways Program is an example of a medical school readiness programs aimed at Latinx first-generation students that leverages Latinx cultural strengths through curriculum and conference participation.

Implications for policy

National and statewide funding for undergraduate institutions to increase Latinx physicians to address physician shortage in underserved communities.

There are financial loan-repayment programs that are incentives to serve in federally qualified health centers, these programs are aimed at resident physicians, once students graduate from medical school. However, funding is needed at the undergraduate level to support students that have high interest and commitment to 'give back' to underserved communities. Especially for low-income students during their undergraduate year to support them as they persist towards their goals to serve the underserved.

Expansion of specialized medical training programs in medical schools to focus on Latinx communities.

Targeted specialized training programs such as Latinx concentrations in Medical Schools. Similar to University of California, Irvine which has a specialized track to prepare physicians to

serve Latinx communities, called 'PRIME Latino Communities.' Concentrations can include curriculum in Medical Spanish, Latinx health disparities and clinical rotations in Latinx and Spanish-speaking communities.

Expansion of Hispanic-Serving Institutions designation to medical degree granting institutions.

As medical schools continue to increase recruitment and partnerships with undergraduate campuses to increase retention and persistence of Latinx students into medical schools, through the Department of Education, Medical Schools need federal designation as a Hispanic-Serving Institutions.

Expansion of premed pathway programs to include community colleges, undergraduate and medical schools.

Health Careers Opportunity Program (high school and undergrad) and Hispanic Centers of Excellence (medical students) are funded through Health Resources and Services Administration and have historically funded the support of underrepresented students pipeline/pathways programs (Campinha-Bacote, et al., 2005). Furthermore, regional networks with partnership with medical schools, universities and community colleges must partner to meet the local community physician needs, for example, CA Medicine initiative.

Conclusion

This dissertation focuses on cultural assets of Latinx students because institutions of higher education continue to marginalize and view Latinx students through a deficit lens in STEM (Yosso, Smith, Ceja & Solórzano, 2009; McGee 2016; McGee 2020). Identifying cultural assets of Latinx students is important as Latinx students will advance into medical school and become part of the culture of medicine. The culture of medicine will mold Latinx students into

the professionalism of medicine that is embedded by whiteness (Ferrel, 2017; Acosta, 2017). Many students will assimilate to fit it and to gain privileges and prestige of medicine. However, few Latinx students will be able maintain their culture and connections with the Latinx community. Thus, it's important to identify Latinx cultural assets to ensure that Latinx first-generation students' cultural assets are being nurtured throughout their undergraduate and medical school years of training. Latinx students may be able to sustain their commitment to communities and underserved communities by pursuing to become bilingual and bicultural physicians. These physicians then can have a long-term impact on Latinx communities by addressing Latinx physician shortages in underserved communities and addressing Latinx health inequities.

Additionally, this is not a complete narrative of the lives of Latinx premed students at Sol University. As this dissertation focused on cultural assets, there is additional data that captures the STEM classroom and campus experiences of Sol University, an emerging HSI. There's additional data on campus climate, lack of faculty mentorship and racism and microaggressions which will be further analyzed in a postdoctoral research project.

Lastly, I offer a final reflection on conducting this dissertation during the COVID-19 pandemic and during a time with so much loss of Latinx family members. During this time, society realized the cost of health disparities across the nation, as Latinx communities had the highest death toll nationwide (AMA, 2020). Structural issues were at the forefront in the news, as Latinx workers were deemed essential workers and had to continue their jobs, exposing themselves and their families to COVID-19. Latinx communities also had less access to testing and lacked information in Spanish during the start of the pandemic. This was the moment that Latinx physicians were needed nationwide. However, only 5% of Latinx physicians graduate

from medical school (AAMC, 2019). Thus, the need for bilingual and bicultural physicians is great and many educational sectors must address premed persistence. The first-generation Latinx students from this study are re-imagining the field of medicine and institutions of higher education must be ready to support Latinx premeds reach their medical dreams. Instead of viewing Latinx first-generation students as struggling in biology, a shift must occur to view them as the next generation of physicians serving Latinx communities. This is the moment for higher education to pay attention to Latinx first-generation premeds, especially within STEM, focus on their stories, aspirations, experiences of discrimination, family loss and grief and their resolve to serve Latinx communities.

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Appendix

Platica protocol for: *STUDENTS*

Introduction: The purpose of this study is to gain a better understanding of Latinx premeds on this campus. I am interviewing various students that identify as Latinx premed students and plan to apply to medical school in 3-5 years. I would like to ask you a few questions about your background. This will take about an hour of your time. If it's okay with you, I will record this session and we will maintain your anonymity in the project. Also, you do not have to answer any question that you consider uncomfortable.

1st *Platica*:

Background:

- Name and year: _____
- Tell me about your family background? educational background?
- What has influenced your decision to pursue medicine?
- What are your plans after college?

Advice and Reflection:

- What advice would you give to a freshmen Latinx premed?
- What do you wish you would have been told during your freshmen year?

2nd *Platica*:

Campus context:

- How was your path to medicine been on this campus?
- How have your science courses been? What style of teaching does the faculty use?
- What are your experiences with your major? Administrators in your major? Faculty in your major? Career services? Counselor?
- Do you study with your classmates?
- How would you describe your classroom environment? Competitive, supportive? How do you make that determination?

Student organizations:

- Are you involved in any organizations or programs for premeds?
- What have you gained from the student organizations that you are involved with?

Academic & Student Services:

- What student services/programs exists that are directly for Latinx students? (STEM programs)
- Which academic campus resources do you use? Non-academic resources? (i.e. CAPS – Counseling, Housing, Financial)
- What resources do you wish that the campus offered?

Advice and Reflection:

- What do you wish your campus knew about your desire to pursue medicine?
- What do you think people misunderstand about Latinx premeds?
- Is there anything else that you would like to share about your path to medicine?

Appendix

Observation protocol

Student Organization Meeting/Workshop Observation Protocol

Date:
Time:
Location:
Topic / Title of Meeting:
Attendance (list):

Purpose/Objective of meeting:

Material used/hand out/ presentations (list):

Reports/Data used for discussion (list):

Format of meeting (describe)

Guiding Questions for Observation:

1. What was the nature of the discussion/topics?

2. Who facilitated the meeting/discussion?

3. What were the points of conflicts?

4. How did students engage?
    a. Asked questions?
    b. Collaboration?
    c. Contagious excitement?
    d. Played a specific role?
    e. Lead conversations?
    f. Other?

5. Was there mention of the following topics?
    a. Giving back to community/volunteering
    b. Health Disparities
    c. Mentoring
    d. Shawdowing
    e. Study/exam strategies
    f. Other health professions, other than medicine (RN, Pharmacy, PA, etc)