Nepantleros and Nepantleras: How Latinx Adolescents Participate in Social Change in Engineering

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Abstract

Previous studies have suggested that Latinx are underrepresented in science, technology, engineering, and mathematics (STEM) fields. The number of Latinx students in the K-12 population is constantly growing but Latinx are disproportionately not pursuing careers in engineering. At the foundation of this problem lies a deficit of critical sociocultural knowledge about these students. Although Latinx adolescents bring a wealth of knowledge, skills, and practices into the classroom, they are often unacknowledged. In this study, we focused on engineering because it has been a field characterized by particularly ethnocentric knowledge and procedures. We propose that Latinx adolescents are both creators and holders of knowledge, and that this knowledge impacts their engineering practices. We analyzed how Latinx adolescents are in constant space of Nepantla that allows for a deeper examination of their families, communities, and forms of oppression. As a result, Latinx adolescents bring forth unique ways of knowing, doing and being that provide them with unique ways of framing, approaching, and solving engineering problems.

Introduction

Dismantling prevailing notions of educational access and opportunity is critical for engineering education policy, practice, and research. Often, the narratives of people of color are omitted from the engineering curriculum. For instance, at the micro level, schooling practices fail to recognize the epistemologies of students of color. Dolores Delgado-Bernal argued that “although students of color are holders and creators of knowledge, they often feel as if their stories, experiences, cultures, and languages are devalued, misinterpreted, or omitted within formal educational settings” (p. 106). The classroom is a representational example of spaces where cultural negotiation begins – the place where epistemologies, or ways of knowing, of Latinx students confront the dominant ways of knowing. As posed by Rochelle Gutiérrez, engaging in the “dominant” knowledge or practices means becoming someone else, and individuals are given few opportunities to maintain or enact their ways of knowing. It is important that the ways of knowing, doing, and being of underrepresented students are valued and celebrated in engineering to move beyond a uniform concept of knowledge.

Based on the idea that engineering is very contextual in nature, and that engineering design is a central component of engineering activity, we recognize engineering not only as a cognitive process but also acknowledge the social, cultural, and historical context in which engineering design occurs. Engineering education must acknowledge and embrace engaging in engineering design activities that involve Latinx adolescents’ practices in their own language, using approaches from their own culture, which allows them to provide engineering solutions to their communities.

To understand the complexities of sociocultural factors present in the enactment of engineering practices among Latinx adolescents, we must validate their material realities and recognize how
youth “negotiate and struggle with structures and create meanings of their own from these interactions” (p. 315). This paper presents a different approach to understanding the complexities of engineering practices among Latinx adolescents through the framework of *Nepantla*. We describe how the ways of knowing, doing, and being of Latinx youth are used to solve community-based engineering design problems as the adolescents “move within and among multiple, often conflicting worlds.” Also, we describe how the adolescents exhibit many characteristics of *nepantleras* and *nepantleros* as they move through different contexts. This paper concludes with recommendations for educators and suggests ways in which future research can be informed by indigenous ways of knowing, doing, and being.

**Nepantla as a Framework**

The concept of *Nepantla* was first introduced by Chicana Feminist theorists to express the importance of those individuals living in “the borderlands,” but also to describe the liminal experiences of an oppressed group of people. The word *Nepantla* comes from the Nahuatl word meaning “tierra entre medio” (land in between), representing the places where people straddle multiple cultures. *Nepantleros* and *Nepantleras* live within two different worlds and as a result live in conflict between two separate cultures. Gloria Anzaldua describes *Nepantla* as

…The site of transformation, the place where different perspectives come into conflict and where you question the basic ideas, tenets, and identities inherited from your family, your education, and your different cultures. *Nepantla* is the zone between changes where you struggle to find equilibrium between the outer expression of change and your inner relationship to it. (p. 548)

This definition suggests that *Nepantla* is not only a place where one straddles two separate/different/conflicting cultures, but also the place where the individual struggles to make sense of these conflicts as a means of bringing about a new sense of homeostasis between the two worlds. Anzaldua explains how individuals in *Nepantla* struggle not only with their culture, but living in this “in between” space allows them to see beneath the surface. For example, living in *Nepantla* allows for the materialization of different forms of hybridity including the mixing of cultures, geographical locations, languages, or identities. This materialization helps individuals understand and recognize their relationship to their surroundings, but at the same time challenge instances of oppression (the truths that may be hidden) beneath the surface. Individuals in *Nepantla*, or *nepantleros* and *nepantleras*, sometimes hold beliefs, ways of knowing, and ideas in that are in tension with one another. Nonetheless, these tensions allow them to see multiple realities from a holistic awareness of their surroundings.

*Nepantla* has been used as a framework in mathematics and science to describe how educational research studies can benefit from learning about perspectives in Latinx studies. Aguilar-Valdez and colleagues argued that, similar to individuals in *Nepantla*, Latinx students in science classrooms are faced with learning the schools’ dominant scientific curriculum while learning science at home. “These circumstances create the conditions where science education becomes an assimilative system that may either marginalize culturally and linguistically diverse students away from the science field or may abruptly force them to transition from the
‘otherized’ views of science to the dominant, Westernized ways of doing, talking, and knowing science” (p. 824).⁹

In mathematics education, Rochelle Gutiérrez² argued that there must be a focus on the critical and community perspectives of knowing mathematics to achieve equity. Gutiérrez suggested that a focus on the connected and embodied ways of knowing mathematics is important when recognizing knowledge that is not commonly accepted in schools. Underrepresented students continuously face the challenge of living in constant tensions around them (e.g., belonging, (in)visibility, identity). “It is this ability to exist in Nepantla that has contributed to the expansion of new ways of asking questions, new theories, and more interdisciplinary approaches to understanding the world around us” (p. 35).³ When these students face uncertainty, they acquire greater awareness of their surroundings and recognize the multiple realities that generate knowledge.²

Similarly, engineering classrooms may not recognize the “outlawed” ways of knowing, doing, and being of Latinx students. Latinx students may come from backgrounds that may or may not share similar values and beliefs as those they experience in the engineering classroom. From a sociocultural perspective, understanding the tensions experienced by Latinx adolescents when confronted with the beliefs, behaviors, and practices of engineering is an integral part in deciding how to provide support systems for students that may feel alienated and excluded from engineering.¹⁰,¹¹ Alejandra Elens¹²,¹³ argued that Nepantla as a framework offers the opportunity for individuals to examine multiple forms of oppression that can lead to decolonial thinking and different perspectives on social justice. Nepantla is the state where perspectives about family, economy, society, and education among others come into conflict. “These are moments of critical awareness, when someone starts to see things from different and new perspectives” (p. 135).¹² Thus, through this sociocultural framework, Latinx adolescents can be recognized as nepantleros and nepantleras – youth that, as a result of their everyday experiences, possess the ability to see beneath the surface, develop critical consciousness, and contribute to their communities.

When one lives in constant tension (e.g., between systems of knowledge), there tends to be a broader awareness or familiarity with uncertainty. Recognizing Latinx adolescents as nepantleros and nepantleras can help us describe their embodied knowledges, and examine ways in which engineering education can provide more culturally responsive pedagogies. In this study, we examined the characteristics of nepantleros and nepantleras to better understand the everyday realities of the adolescents, and observe how they responded to the community needs with a desire to effect social change. As indicated by Keating, nepantleros and nepantleras use their views to “invent holistic, relational theories and tactics enabling them to reconceive or in other ways transform the various worlds in which they exist” (p. 9).⁴ Thus, we argue that Latinx adolescents not only solve engineering problems using their ways of knowing, but also become agents of change and inspire others to do the same.

**Researcher’s Positionality**

Qualitative research is impacted by the researcher’s worldview, background, identities, experiences, and assumptions. Thus, within ethnographic approaches to research, it is important
to reflect on one’s biases, values, and experiences and make those explicit through reflection.\textsuperscript{14} Reflexivity involves a conscious awareness of the context of the study as well as the realities of the participants. In this study, our sensibilities to the “borderlands” best describe our approach to describe the adolescents’ liminal experiences and how these experiences impacted their engineering practices.

The first author’s “sensibilities” emerge from his own experiences as a first-generation Latinx engineer in the United States. Living between two worlds and in conflict with two separate cultures best describes this sensibility. Author 1 grew up in Mexico but completed his high school and postsecondary education in the United States. Similar to the adolescents in this study, his native language is Spanish and he learned English while enrolled in the English as a Second Language (ESL) program in high school. His experiences as an engineer are informed not only by the knowledge gained through postsecondary education, but also through his everyday life experiences growing up in a rural, low-income community in Mexico. As a member of that community, he has been interested in issues of social justice and equity for Latinx in STEM. Living in the borderlands of engineering motivated Author 1 to investigate the ways in which Latinx adolescents are “holders and creators of knowledge.” The goal was to create bridges between the adolescents’ everyday lives and formal instruction in the engineering classroom.

In addition, none of the authors interfered with the engineering problem-solving approaches. Instead, Authors 1 and 2 acted as facilitators during the different group meetings to prevent leading the adolescents to specific answers. During these group meetings, the conversations were carried out in Spanish to let the adolescents express themselves in their language of preference. The interactions were not limited only to the community-based engineering problem activities. Author 1 took an active role in providing the adolescents with resources for scholarships and college admissions information. Moreover, Author 1 and some of the adolescents shared cultural and social similarities which facilitated building up confianza, or trust, with the adolescents.

We acknowledge that Latinx adolescents’ ways of knowing and meaning-making practices in engineering should not be silenced or sanctioned. We recognize the wealth of bodies of knowledge, skills, and practices that Latinx adolescents bring to the classroom. Our work views Nepantla as the state that leads to new knowledge, and acknowledge that framing engineering problems with a different worldview is not a “deficient” understanding of engineering in general. On the contrary, we suggest that recognizing Latinx adolescents’ unique perspectives of viewing engineering has the potential of creating opportunities for culturally responsive engineering education.

**Context of the Study**

This project took an ethnographic approach to qualitative research\textsuperscript{14} to investigate how Latinx adolescents became nepantleros and nepantleras as they worked in community-based engineering challenges. Analyzing ethnographic data brings a strong cultural lens to the study by describing and interpreting patterns of behavior, customs, and ways of life.\textsuperscript{15}

The data presented in this study is a secondary analysis from a previous study that analyzed the funds of knowledge of Latinx youth.\textsuperscript{16-18} Fifteen adolescents (ages 14-17) were purposefully
selected to participate in the study. All participants had previously received English as a Second Language services and spoke Spanish at home. The adolescents were grouped into four different groups. Each group was asked to select a problem in their community they wanted to address.

The problems were selected by the participants themselves. The four different challenges included: (1) designing a water-resistant shoe to be used in cold weather; (2) designing a water catchment system; (3) redesigning a swing for kids in wheelchairs; and (4) designing a headrest for a shower chair for kids with muscular dystrophy. Each challenge corresponded to four different groups consisting of 3 boys, 4 girls, 3 girls, and 3 girls and 1 boy, respectively. Each group met twice per month in locations selected by the participants to work on their projects. It is important to mention that this study did not evaluate the adolescents’ designs, but the intent was to analyze and describe how the adolescents engaged in engineering practices, and how these activities allowed them to recognize social change through engineering.

The study was conducted by a research team that consisted of two Latino engineers and a faculty member with education and literacy expertise. We followed the adolescents for a period of 9 months, facilitated meetings throughout the duration of the project, mentored the adolescents, and analyzed the whole data set.

**Data Sources**

For this study, data sources included participant interviews, video-recordings and observations of group discussions, and retrospective and concurrent protocols – or the narratives of everything that the participants did or said in a particular setting. Participant interviews ranged from 30 to 60 minutes in length and were audio recorded. In the monthly one-on-one interviews, questions were asked to further determine how students – living in the borderlands – could “see underneath the surface.”

Each group met twice per month, with each meeting lasting between 90 minutes and two hours. Participant were video-recorded and observations were conducted during the meetings to understand the different practices in which the adolescents engaged as they attempted to provide solutions to the community problems. The adolescents talked about their designs, challenges, constraints, or potential solutions to solve the problems. The data collected during these meetings highlighted how the adolescents engaged in critical analysis of their communities and, sometimes, socioeconomic or sociopolitical contexts in which engineering occurred.

The purpose of the concurrent and retrospective protocols was to ask the participants to explain what they were thinking during specific tasks and to relate their think-aloud processes to engineering. Through this data collection method, we determined how their actions and thoughts were related to *Nepantla* and the realities that surrounded them (social, political, economic, cultural).
Data Analysis

As mentioned previously, this study involves a secondary analysis of data collected from a previous study. Only Authors 1 and 2 were part of the initial study and conducted the data collection and analysis of the whole data set. Authors 3 and 4 contributed to the secondary analysis of the data presented in this paper. The transcripts obtained from every video and audio recording were analyzed using the qualitative data analysis software NVivo 10, which helps to manage, organize, and analyze text and multimedia information. Analysis of the data involved emergent coding and thematic analysis. The works of Keating and Kasun were used to create a list of a priori codes that were applied to the data. The predefined codes obtained from the literature review (i.e., a priori codes) served as the basis for data analysis and the development of new codes. For example, some of the a priori codes included “bilingualism” and “sobrevivencia (survivalist) knowing” from the work of Kasun, which later was combined with other codes to create “transnationalism” and “Nepantlera and Nepantlero knowing” themes. New codes emerged during the study through systematic and careful analysis of the data. Emerging themes were identified for further evaluation using reconstructive analysis. The following sections includes representative examples obtained from the data analysis. We decided to focus on these salient themes because they were representative of the whole data set. These examples serve as telling cases representing similarities exhibited by other groups, and provide a better theoretical interpretation of the data.

Findings and Discussion

Analysis of the data revealed three major themes that included: (1) Transnationalism and Nepantla, (2) Nepantlera and Nepantlero Knowing, and (3) Conciencia and Empathy. Data indicated that the adolescents challenged the inequality of resources available to them and their community. They also demonstrated living in a state of Nepantla by living in two dissimilar worlds. At the same time, the adolescents had the opportunity to bridge two worlds by acknowledging and understanding their own identities, communities, and environments. Instead of searching for a single truth, they embraced their ways of knowing, doing, and being and accepted this knowledge as compatible with the world of engineering. The following sections highlight the themes that emerged from the data.

Transnationalism and Nepantla

Previous to this study, we identified the labor history of the family as being one of the main means of gaining knowledge and skills. This knowledge also derived from living in another country or crossing different boundaries. These global perspectives gave participants the ability to observe how processes and structures differ around the world. Participants used this Nepantla perspective to compare and contrast solutions and approaches to problems. Their transnational experiences, or these “in-between spaces,” allowed them to see beneath the surface. For instance, living in two geographically different spaces allowed the adolescents to compare rural and urban settings, the scarcity or abundance of resources, and language-based differences. Living in Nepantla (the in-between space) allowed the adolescents to see not only the needs of the community, but also helped them develop a commitment to the well-being of these vulnerable populations. Paula exemplifies this theme. As a Honduran immigrant to the United...
States, her lived experiences in both countries gave her a different perspective and a contextual understanding of engineering. Paula and her group worked on developing an affordable water catchment system to provide potable water to the community. During one of the group discussions, Paula explained the devastation created by Hurricane Mitch and the problems that evolved after the disaster. In fact, Paula’s experiences influenced the selection of the team’s community-based engineering design problem. Thus, her experiences inspired the other group members to commit to this vulnerable population, provide a solution to their problem, and become agents of change in that community.

During a group meeting, Paula described how Hurricane Mitch’s devastation had created multiple problems for the community. She said, “Hurricane Mitch destroyed a lot of pipelines where water runs, so water is not accessible by a lot of people and the majority of water that does come is contaminated because the pipelines are broken.” Later, she indicated that the problem was much bigger because the humid climate and open bodies of water created the perfect conditions for malaria. Consumption of contaminated water, according to Paula, was one of the major problems to eradicate malaria or dengue in Honduras. In addition to the sanitation issues, she recognized that corruption and embezzlement prevented public works from ever getting completed.

Her experiences with Hurricane Mitch brought to light the global need for affordable and clean drinking water. Her transnational perspective and the tensions (e.g., mixing of nation and state identities, geographic location, history of broken promises) brought about from her Nepantla position influenced the problem the group decided to address. Moreover, living in Nepantla allowed Paula to be uniquely positioned in a state of uncertainty. In this state of uncertainty, Paula acknowledged that engineering is not politically or economically neutral – she could see beneath the surface.

Paula compared the situation in Honduras to her life in the United States. She expressed how she had to navigate this “in-between space” and come to terms with her experiences in both countries. Her experiences provided her not only with the tools to see underneath the surface, but also with the tools to become an agent of change. These tools included seeing engineering as a way to challenge disproportionalities or colonial issues. She identified different constraints and criteria for the problem such as the limited access to safe drinking water, the socioeconomic status of the population, and the spread of dengue and malaria from contaminated water consumption. Paula’s descriptions “brought about an awareness of realistic problems that exist in today’s ever changing global economy” (p. 6).

Paula exemplifies how living in a state of Nepantla allowed her to acquire a greater awareness of her surroundings. Additionally, her transnational experiences allowed her to recognize the multiple realities in which she lived and create new knowledge. All participants shared some aspects of Paula’s transnational experiences. Similarly, the adolescents in this study demonstrated parallel tensions experienced by Paula. Experiencing poverty in a different context contributed to their sense of commitment to serving vulnerable communities. These experiences provided the adolescents with the awareness necessary to define the scope of the problem. They considered factors that included not only material factors but also specific audiences and the effect of their designs on those populations. According to Atman and colleagues, problem
definition is one of the most critical steps in the engineering design process because it becomes the basis of good engineering practice. Living in Nepantla allowed the adolescents to generate the criteria and constraints necessary to define the problem in their communities.

**Nepantlera and Nepantlero Knowing**

Health and well-being was another concern addressed by the Latinx adolescents in this study. Nepantleras and nepantleros demonstrated sobrevivencia knowing⁷ as they tackled challenges that addressed health concerns. The data showed different patterns where the participants described their experiences with health-related issues and their perspective on how to help vulnerable populations. One of the participants, Tomas, had two brothers who suffered from muscular dystrophy. Talking about the problems he experienced at home motivated him and his group to work on designing an adjustable headrest for a shower chair for kids with muscular dystrophy.

Tomas understood not only the signs and symptoms of muscular dystrophy, but he also learned scientific concepts about the disease. During a group meeting, Tomas described muscular dystrophy as a disease where “muscles stop working so [individuals with muscular dystrophy] will eventually get permanent to the wheelchair.” He also indicated that “only boys will get [muscular dystrophy]” because males are statistically more susceptible to developing the genetic disease, and that some of the signs included progressive deformities, fragile bones, and eventual loss of muscle strength.

As the group discussed several options to help Tomas’s brother, and before deciding on the adjustable shower chair headrest, they discussed the option of designing a wheelchair that could make it easier for his brother to move around. During the group meeting, Tomas interjected,

...[people with Duchenne Muscular Dystrophy] get so scared and think they’re going to fall. Their bones break so easy. Even falling on the grass would be scary. Even going on a bump is scary. A wheelchair that can do that [points to picture of wheelchair that can climb up stairs without a ramp], I think that’s a cool wheelchair. But the thing about the ramp, is that they could go up perfect into the house without moving them [gestures as though he is being bumped or jarred], because they get scared about moving [being bumped] and stuff like that.

Tomas drew from his experiences caring for his brother and his sobrevivencia knowledge to evaluate a solution. Tomas’s nepantlero knowledge, which can be perceived as undervalued because was not an “expert” in the disease, was used to evaluate an engineering solution to the problem at hand. He defined the criteria for a device that could help individuals with muscular dystrophy while taking into consideration other constraints. He considered the constraints based on the perspectives of somebody with the disease. Tomas acknowledged the daily challenge of living in the constant tension of his brother being highly invisible and visible at the same time.²,²⁶ This constant tension also lead to more conocimiento, or familiarity with his surroundings. Moreover, embracing his nepantlero knowing provided the group to see the world differently and understanding that engineering is contextual.
It was observed that the adolescents used their *nepantlera* and *nepantlero* knowing to provide solutions not only to familial situations that would help them thrive, but also to provide appropriate engineering solutions for their communities. Their ways of knowing were used to bridge two dissimilar worlds: a world that acknowledged their indigenous knowledge and the world of engineering primarily dominated by a different type of discourse.

**Conciencia and Empathy**

One of the most important themes, and the most prevalent, was that of empathy. It was observed that most, if not all, of the participants talked about empathy in one way or another. Moreover, it was because of empathy that they were able to develop *conciencia*. *Conciencia* is described by Paulo Freire\(^\text{28,29}\) as the process by which humans become more aware of the sources of their oppression. As mentioned before, Paula, who participated in the group that designed a water catchment system, noted that the source of many of the problems were not only related to the devastation of Hurricane Mitch. Some of the problems were more politically and economically driven. She indicated during an interview that corruption often resulted in a lack of resources for those most in need. Paula and her group focused on the poor regions of Honduras because she noticed that most of the problems created by Hurricane Mitch led to “limited access to water.” During an interview, she compared and contrasted Hondurans’ access to water according to the population’s socioeconomic status,

*En Honduras si una persona tiene bastante dinero manda hacer su propio pozo.* (In Honduras if a person has enough money, he/she can make his/her own well). Because in the capital water is kind of easy to access but it’s not quality water. They might have more water but they don’t necessarily use it, they don’t use that water to drink.

Living in a state of *Nepantla* helped Paula understand how access to water was influenced by socioeconomic status. “Rich people,” according to Paula, could afford potable water from a distribution center or they could simply dig their own well. At the same time, her group wanted to focus on creating effective, yet affordable, solutions for vulnerable populations in Honduras because they knew those communities were prone to malaria and dengue. As *nepantleros* and *nepantleras*, the adolescents envisioned a more just future through engineering practices that recognized their multiple realities.

One of the most common topics of the adolescents’ conversations was the lack of resources in the community. The adolescents identified the lack of money or schooling as the source of many of their struggles. These factors were connected to the fact that most of their families or members of the community had no access to high paying jobs because of their historical treatment as immigrants. During one of the conversations, Sofia – a member of the group that designed the shower chair adjustable headrest – mentioned that she wanted to provide solutions to people in their community working at a meat-packing plant. However, she desisted from addressing that specific problem because she thought it would become very politicized. She understood that her community had a history of struggle and subjugation and wanted to prevent any harm to them. This is a clear example of *conciencia* and empathy. Living in a liminal state\(^5\) provided Sofia with a different set of decision-making skills and approaches to solve problems in the community. She was aware that options were limited by economics, politics, and social constraints. In this way,
Sofia demonstrated an understanding of the importance of ethics in engineering. Ethics was identified by Moore and colleagues as an important characteristic of the engineering profession. According to Moore and colleagues, students should be exposed to ethical considerations as they learn to address issues in a responsible manner and consider the resources of the clients.

**Conclusions**

This study investigated how Latinx adolescents engaged in engineering practices that led to a better understanding of social change through engineering. The adolescents’ everyday practices, knowledge, and skills demonstrated that they live in an in-between space (Nepantla). At the same time, they use their positionality to provide bridges between two dissimilar worlds: one that acknowledged their indigenous knowledge and one where their knowledge was sometimes not validated.

The assumption that engineering is created only through one kind of knowledge leaves no room for discussion of other worldviews or opinions that challenge the existing engineering norms. The beliefs and assumptions regarding homogeneity in engineering education have impacted the culture of engineering and therefore the “acceptance of difference” – whether it is difference of thought or knowledge. The adolescents in this study challenged current engineering assumptions. “Being exposed to a rigid interpretation of dominant science, for students, is painful – it is culture shock and an arrebato that pushes students into Nepantla” (p. 851).

We recognized the Latinx adolescents in this study as nepantleros and nepantleras, those who experience Nepantla, through their journeys as they solved problems in their communities using the engineering design processes. The adolescents in this study demonstrated that they are nepantleras and nepantleros, and by living in Nepantla, the in-between space, they were able to provide a different interpretation of what engineering means while recognizing their everyday realities. They created bridges and, through their engineering design practices, positioned themselves as agents of change. After the study was complete, and during final interviews, data showed that the community-based engineering design challenges helped the adolescents change their perceptions of engineering and see themselves as engineers that could provide social change in their communities. Their conception of engineers changed and included several traits such as helping others, working in teams, and creating ideas that helped their communities. They saw themselves as active members of their community that could see beneath the surface. Their experiences and nepantlera and nepantlero knowledge allowed them to see the potential for transformation in their communities. The adolescents did not only attempt to solve engineering problems using their everyday life ways of knowing, but also provided a venue for them to become agents of change and inspire others to do the same. We argue that the knowledge emerging from their nepantlera and nepantlero knowledge can be incorporated into their learning as a way to foster their personal agency and engage them in engineering education activities.

For example, there are other indigenous practices that address community issues such as coyuntura analysis. Coyuntura analysis, or the analysis of the correlation of forces at one moment in time, integrates research, analysis, reflection, and action to understand how different
factors lead to specific problems in our present. Using concurrent protocols or surveys in the classroom, educators could help bring to light the narratives that students bring with them to the classroom. First, students can identify the top 5 problems in their community. In this process, the educator would be responsible for asking the questions of who is or not involved in those problems and who needs to be considered. The second part of the process would involve selecting one of those problems and determine what are the causes that originated that problem. By addressing the problem, the students can also address the causes of the problem. The goal would be to provide a solution to the problem in a socially just manner.

*Coyuntura analysis* can further unveil the practices and narratives that are part of *nepantlera* and *nepantlpera* knowing. Using those narratives as a reference, students or educators could frame their own challenges or problems that address community needs. This strategy could help educators when they work to design new or future engineering challenges in the classroom. Educators can take the information from the students to create new engineering design challenges or address community-based engineering design challenges. This process is both validating and empowering for the students because it provides agency and acknowledges the indigenous ways of knowing, doing, and being of students.

Too often Latinx adolescents, depending on their pre-college experiences, may not even understand that becoming an engineer means that they are agreeing to go into a White-dominated space. They may quickly become aware of the fact that they are the only person of color in the room. Some may even be mistaken as unskilled laborers once they set foot on a job site. Even when they do not have the words yet to describe it, they know they need to think about their role as an engineer and the effect they have on their community. As educators, we are responsible for providing empowering, validating, and culturally responsive education to Latinx adolescents and students of color. They are *nepantleros* and *nepantleras*, agents of social change, and we must listen to their voices and acknowledge them.

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**Bibliographic Information**


