



(Fundamental) Fregados Pero no Jodidos: A Case Study of Latinx Rasquachismo

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Abstract

Very little research has examined the ways that Latinx adolescents might use *rasquache* forms of expression to empower them in their engineering design activities. Even less research has been conducted on how the assets of Latinx students contribute to the diversification of engineering epistemologies and to form critically conscious engineers. In this paper, we present what involves *Rasquache* forms of expression and how it can contribute to a more asset-based approach to the teaching and learning of engineering.

Introduction

Among racial/ethnic minorities in the U.S., Latinx are particularly underrepresented in engineering. While the Latinx population is the fastest growing major racial/ethnic group in the U.S [1, 2] and Latinx workers make up 15% of the general workforce, they comprise only 7% of the STEM workforce [3]. Although different scholars have offered several reasons behind why Latinx students do not pursue STEM careers—particularly engineering—many scholars have argued that one particularly powerful reason is that the cultures of students do not fit the “cultures of engineering” [4]. For instance, the National Academy of Engineering and National Research Council argued that engineering “curricular materials do not portray engineering in ways that seem likely to excite the interests of students from a variety of ethnic and cultural backgrounds” [5], p. 10]. Educators, therefore, need to develop their capacity to connect classroom content to the social, cultural, and historical contexts in which students live [6, 7].

From a sociocultural perspective, learning is an intrinsic and inseparable aspect of social practices [8]. Engineering education, however, sometimes lacks a well-situated view of engineering that acknowledges the wealth of knowledge, practices and skills of many non-traditional populations in engineering (e.g., the religious, political, environmental and cultural capital that are interwoven in many communities of color). Much of the research done in engineering education has focused on highlighting the “needs” of students of color, while failing to recognize the assets that they bring to the classroom [9]. There is a predominant notion that students (particularly low-income, minority students) fail in school because such students and their families experience deficiencies that obstruct the learning process (e.g., lack of motivation, inadequate home socialization) [10, 11]. This idea follows the “empty glass” concept that educators need to fill students with knowledge without recognizing that they have knowledge within.

This narrow conceptualization of the generation of knowledge in engineering does not account for the existence of alternative epistemologies. Moreover, engineering may sometimes fail to acknowledge the material realities (e.g., the intersections of the sociocultural landscape, history and cultural and political past and present that create complex interactions and interpretations of lived realities) of students whose embodied knowledge may not align to the structural norms of formal schooling [12]. The assumption that engineering is only created through one kind of knowledge impacts the “acceptance of difference” [13]. It is important that students, especially Latinx students, see themselves reflected in the curriculum and provide spaces to engage them in

engineering activities in their own language, culture, and communities.

This paper introduces a new paradigm by inverting the logic portrayed in many studies involving research that identifies Latinx as a monolithic group [14]. In order to validate the lived realities of Latinx students, we seek to change the conversation from “what knowledge do Latinx students need?” to “what do Latinx students offer to the construction of knowledge in engineering?” We present the concept of *rasquachismo* as an approach that centers on the everyday realities of Latinx youth in order to recognize their embodied knowledge, forms of survival, resistance, and daily practices that challenge contemporary schooling institutions [15]. *Rasquachismo* represents not only resistance, but also knowledge construction that reflects legitimate, creative, and artistic forms of expression of Latinx youth [15]. We assert that acknowledging these forms of knowledge and knowledge construction is important in engineering as we seek to provide better opportunities for participation and inclusion for underrepresented students, and to expand the taxonomy of engineering education research [16-18] to value the *conocimiento* gained through the complex processes Latinx encounter in everyday life [19-21].

To illustrate *rasquachismo* in an engineering context, we describe a case study from a larger study [9] to illustrate how *rasquachismo* is enacted by Latinx youth. We also provide a description of *rasquachismo* in a larger context, and the importance of fostering an environment that enables students and practitioners to bring forth their embodied knowledge into engineering.

Theoretical Framework

The concept of *rasquachismo* was initially coined by Tomás Ybarra-Frausto to describe Latinx artistic expressions that emerged from working class, marginalized, and bicultural sensibilities [22]. The framework was initially used to discuss art expressions, but it has been applied to other areas including Latinx pedagogies [15]. Ybarra-Frausto argued that everyday aesthetic practices of Latinx involves “making with whatever is at hand” [17, p. 191]. He posits that,

To be *rasquache* is to posit a bawdy, spunky consciousness, to seek to subvert and turn ruling paradigms upside down. It is a witty, irreverent and impertinent posture that recodes and moves outside established boundaries... In an environment always on the edge of coming apart (the car, the job, the toilet), things are held together with spit, grit and *movidas*. *Movidas* are the coping strategies you use to gain time, to make options, to retain hope. *Rasquachismo* is a compendium of all the *movidas* employed in immediate, day-to-day living. Resilience at hand, *hacer rendir las cosas*. This use of available resources engenders hybridization, juxtaposition and integration. *Rasquachismo* is a sensibility attuned to mixtures and confluence, preferring communion over purity ... *Rasquachismo* draws its essence within the world of the tattered, shattered and broken: *lo remendado* (stitched together) [22, p. 191].

It claims that aesthetics are true representations of structures of thought and feeling, as well as the ability to create own cultural productions, identity, and survival [22, 23]. *Rasquache* aesthetics are also “inappropriate” in the sense that other may consider it lower class and vulgar [24]. At the same time, *rasquachismo* defies the rules and behaviors set by dominant paradigms

and class [24]. For example, certain forms of *rasquachismo* include the use of tin cans to be used to make flower planters, reusing tires as retaining walls in a garden, using old butter containers to refrigerate *frijoles* and *salsa*, or reusing *mole Doña Maria* jars as drinking glasses [15]. Moreover, it reflects Latinx communities' abilities to thrive in different contexts, survive oppressive forces, and resist dominant paradigms by producing legitimate artifacts and knowledge [15, 25]. In essence, *rasquachismo* posits that, although not valued in classrooms, Latinx's practices, sensibilities, and forms of expression are sources of knowledge production. Although not considered a science, *rasquachismo* is a form of expression and a mindset rooted in ingenuity, resourcefulness, and improvisation, which offer a natural opportunity to engage in engineering design practices [26, 27].

An example of how *rasquachismo* has influenced engineering practices among Latinx is by doing an analysis of lowriders [28]. For instance, Bright investigated how Latinx in Española – a town located in northern New Mexico – made alterations to their cars to personalize them. Lowriders were considered “bad” in the sense that it is both desirable and pleasurable, but also the product of social experiences [29]. According to Bright,

Lowrider cars belong to a social life based in large part on gifting, tinkering, and bartering within kinship and friendship networks...Cars are used and reused. Many are lowered and have hydraulic pumps installed at the wheels to make the cars lift up and down, bounce, and even dance on demand. Dents are repaired. Rust is removed and metal replaced. If a car is beyond use, then it is used for parts. Sometimes the car bodies are used as barriers for flood control in the sandy arroyos. Parts of old cars are often sold at swap meets [29, p. 591].

Lowrider cars are a key example of *rasquachismo* where Latinx aesthetic and sensibilities “turn ruling paradigms upside down” to produce “a sort of a good taste of bad taste” [22, p.155]. It exemplifies the existence and subsistence of individuals, as well as an attitude of survival and inventiveness [22, 30]. Individuals engage in practices that are related to engineering, even when it can be perceived as “bad taste.” There are practices related to engineering including working with materials, using tools, analyzing trade-offs, working under economic constraints, installing mechanisms, gathering information, design thinking, and developing and using models [9, 14, 31-33]. There is the construction of Latinx’s own material world by undoing colonizing constructions of engineering knowledge, race, ethnicity, and education. *Rasquache* pedagogy recognizes the embodied knowledge of individuals while validating their construction of new knowledge in spaces that are not only restricted to the classroom or exclusive of hegemonic practices.

Researchers’ Positionality

For the authors, growing up “*rasquache*” was part of the normal everyday life. It meant living in a world that defied hegemonic standards. Old car tires were used to make fences, *mole Doña Maria* glasses were part of the dinnerware set, and aluminum foil was used to get analog television signal. *Rasquachismo* was not only part of art representations, it also meant survival strategies grounded in material realities, inventiveness, resilience, lived experiences, and positionalities. We recognize that this wealth of knowledge creates a natural path toward

engineering practices, and that the knowledge, skills, and practices that emerge from *rasquachismos* can be transformative in engineering education.

Although given a negative connotation, *rasquachismo* is also inspiration that helps communities thrive in adverse situations. It involves forms of knowledge, skills and practices that may be deemed low class. Yet, this wealth of knowledge is also valid, rich, and powerful. We acknowledge that these meaning-making practices should not be silenced or sanctioned [14], and that a different engineering worldview is not a “deficient” understanding of engineering. Our own cultural experiences have influenced our work and the direction of our analysis. Even though some of the *rasquachismos* cannot be “scientifically” explained by Latinx youth [34], we believe that acknowledging this knowledge is the first step in creating bridges between formal and informal spaces in engineering. Our interest in working in these issues emerged from our lived experiences, our close relationships with the Latinx communities, and our own cultural backgrounds.

Although deficit models lack empirical validation, they have a powerful influence in educational practice [10, 11, 35]. The notion that underrepresented students possess motivational and cognitive deficits, marginalizes students and perpetuate false models of meritocracy in educational structures; thus, going against the very ideal of social justice. We are strong proponents of “asset-based” approaches to engineering education to promote learning in meaningful and relevant ways, while challenging deficit thinking models. We believe that the research we conduct could potentially transform and shift deficit paradigms in engineering education, and positively impact the large number of Latinx adolescents seeking to pursue engineering degrees.

Case Study Context

The case study presented here is part of a secondary analysis from a larger study that studies the funds of knowledge of Latinx adolescents and their correlation to engineering practices [9, 33, 34, 36]. The study involved an ethnographic approach to bring a deeper understanding of patterns of behavior, customs, and ways of life [37, 38]. The larger study involved a group of 14 adolescents who were interested in addressing problems in their community. The larger study involved a series of interviews, video-recording, and observations of the adolescents as they addressed the problem in their community. The interviews ranged from 30 to 60 minutes and were recorded every month. It was during one of those meetings that we identified how she engaged in “*rasquachismos*.” The data presented here is a representative example of (telling case) that provides a better interpretations of the gathered data [39, 40].

In this analysis, we focus on Laura – one of the adolescents participating in the larger study. Laura was a 16 year-old adolescent whose parents immigrated from Michoacán, Mexico, and lived in the Western United States at the time of the study. Laura was interested in providing some solution to her community, specifically she was interested in designing a playground swing for children in wheelchairs in their community.

Data Collection and Analysis

For this analysis, data sources included interviews, observations, and retrospective and concurrent protocols. The interviews were approximately 60 minutes and they were audio recorded and transcribed. Questions related to Laura's transnational experiences, household practices, and about her community and family were asked during the interviews. She was asked to draw sketches as she was narrating different "*rasquachismos*" which were later used as prompts for retrospective protocols [41]. She talked about a stove (an event that is described in the next section) that she built with her family to be used for her family's *restaurante* in Michoacán. The data collected during these interviews highlighted how Laura engaged in *rasquachismos* as a form of expression and survival. The purpose of the retrospective and concurrent protocols was to ask Laura to explain what she was thinking as she was performing a specific task (e.g., sketching) [41]. This data collection method provided a better description of Laura's actions, thoughts, and embodied knowledge.

As indicated previously, this study involves a secondary analysis of a larger study. Mejia was part of the initial study and Pulido contributed to the secondary analysis of the data presented in this paper. Analysis of the data was done through emergent coding and thematic analysis [42, 43], where the work of Mendoza [15] was used to guide the analysis through a *rasquache* lens. Codes were identified and grouped through systemic and careful analysis of the data, and emerging themes were identified from further reconstructive analysis [42, 43]. We decided to describe salient themes as a group in order to provide more context for the case study. The following section describes the findings from this secondary analysis.

Analysis of *Rasquachismo* and Engineering – A Case Study

Laura grew up in the Western United States but was forced to move to Mexico when one of her parents was deported. She was also forced to spend the summers in Michoacán for a few years in a small community where her family resided. Laura experienced transnationalism first hand, which is also the reality many Latinx adolescents living in the U.S. [44-46]. It was during this time in Mexico that she learned how to contribute to her family's business to make money. Her family owned a small restaurant, and she helped the family business by preparing food for the many clients that would come to the restaurant every day. Laura learned how to be resourceful and had to adapt to many economic constraints – a skill that is relevant to engineering. For example, she learned about how to repurpose different objects and soldering to create a new artifact that could be used to cook food. One day, as Laura recalled during an interview, the stove stopped working and they needed a solution to their problem. Not only was the stove expensive to repair, the unexpected issue would affect their source of income. What Laura described next is the epitome of *rasquachismo*.

According to Laura, her family repurposed an antique washing machine – *una chaca-chaca*, as she called it. These types of washing machines are commonly known in Mexico as *chaca-chacas* for the sound they make during the washing cycle. They are simple top-loading roller washing machine with a mangle attached and known in the U.S. as wringer washers. They disassembled the washing machine and used the tub as a skeleton for the stove's cooktop. Then, they covered it with *barro*, a mixture of clay-like readily available materials in the community, to withstand

the high temperatures. Laura created a sketch of her design and described it during one of the interviews,

We used the top part of the *lavadora* (washing machine). The bottom we didn't need, so we covered the rest out with mud – I guess so when it burned it wouldn't melt the metal, and so we had all mud and the inside was mud. That's how you make everything, with mud. You make a lot and it's – I think the fire it wouldn't melt [the metal], like it would be too strong for the *lavadora* (washing machine)... So we put mud and the mud can handle the heat.

Laura went on to describe the new artifact and to explain that the *barro* created a protective layer to make the new “stove” more efficient. Laura lived in a region of Mexico where the community has, relied for centuries on *barro* to make sculptures, bowls, plates, and vases among others. She described how, step by step, they disassembled the *lavadora*, took out the motor out, and covered the inside and outside of the cylindrical tub with the materials available. They placed an earthenware *comal* made with *barro* on top of the cylindrical tub so that the *comal* could be used to cooktop. She also indicated that a small rectangular cut was made on the bottom of the cylindrical tub to put *leña*, or firewood, inside their new creation.

Laura laughed during her description of the new artifact she and her family had created. She described the design as “weird” and did not think it was something that should be deemed important. For Laura, this was the reality of her everyday life – she had a problem and needed to solve it to provide income for her family. It also describes a form of resistance by reflecting on the social conditions of her community [15] while embracing new epistemologies. This description exemplifies *rasquachismo* at its best – a good example of the existence and subsistence and an attitude of survival and inventiveness. Even though it can be perceived as “bad taste,” it challenges the colonizing constructions of engineering knowledge [47] by demonstrating that engineering knowledge is not created only restricted to classroom settings or hegemonic practices.

Although it may not seem important for Laura, the processes in which she engaged closely related to engineering practices. Her embodied knowledge demonstrated her understanding of materials, cost constraints, production and processing, use of tools, design thinking, and sense-making processes [9, 33]. She used skills, practices, and knowledge that emerged from her own social, cultural, and historical contexts. *Barro* is a material that has been used for centuries by the Mesoamerican first nations to create different forms of art expressions and make artifacts used in everyday life. She relied on that knowledge to make something even more complex that legitimizes her ability to create know knowledge. This example provides a clear description of how students of color are holders and creators of knowledge [12]. Moreover, although it may be deemed “low class,” Laura's *rasquachismo* represents a resistance to dominant paradigms in engineering by producing a legitimate artifact and producing knowledge.

Discussion

Dominant engineering paradigms often rely on having resources. As indicated by Wachs [48], engineers have been masters of technology driven mostly by economic motives and influenced

by corporations and government. *Rasquachismo*, on the other hand, is a model that has been appropriated by those who do not have resources and embrace ambiguity, ingenuity, and resourcefulness - *rasquachismo* is rooted in experience for survival and resistance. Nonetheless, *rasquachismo* also becomes a vehicle to the world of engineering. Similar to engineering, *rasquachismo* seeks to (1) generate potential solutions to a problem, (2) accomplish simple tasks through complex ingenuity, (3) generate representations of ideas (e.g., prototyping), (4) evaluate solutions and artifacts based on one or more criteria or constraints, (5) work with causation (e.g., an action leads to a reaction), and (6) implement a series of processes to solve a problem or meet a need. Laura's story illustrates how her *rasquachismos* and *movidas* [22] allowed her to use everyday materials (e.g., *barro*, *chaca-chaca*) and repurpose them to create a new artifact and provide a solution to a problem. Laura identified how different physical variables (e.g., structure of the *chaca-chaca*, cooktop, consistency of the *barro*) influenced other components of the system. She possessed many practices that are relevant to engineering such as defining problems, identifying criteria and constraints, modeling, empathy, and the use of tools [9, 33, 34].

Rasquachismo has an inherent common good where the parts are inseparable from the whole and not the other way around. Laura approached the problem with the goal of helping the collective, which was also what drove her decision-making and creating process. Although it might have led to a less-effective artifact or one that is temporary, it addressed the immediate concern or problem. Although not considered a science, *rasquachismo* is a form of expression and a mindset rooted in ingenuity, resourcefulness, and improvisation, which offer a natural opportunity to engage in engineering design practices [26, 27].

The case study described in this paper challenges the deficit models that Latinx adolescents too often face in U.S. classrooms. It posits that Laura engaged in activities that have similarities to engineering habits of mind and dispositions, yet her knowledge can potentially be unacknowledged or honored in engineering classrooms. At the core of this problem is the lack of validation of the material realities of the adolescent. Often, the narratives of people of color are omitted from the engineering curriculum; thus, continuously reproducing social inequalities and academic hierarchies. In engineering, particularly, the material realities of students of color—which are perceived as non-sophisticated epistemologies—are replaced by dominant discourses.

The embodied knowledge, practices and forms of expression of Latinx youth have a place in the classroom. They bring a wealth of knowledge, skills, and practices that can be used to not only frame, approach, and solve engineering problems, but also to express their *sensibilidades* – their sensibilities. According to Tomás Ybarra-Frausto, being *rasquache* is the visceral response to lived reality and an attitude rooted in resourcefulness and adaptability [22]. Focusing on the material realities of students, making them aware of their history, and emphasizing the firm believe that students are creators and holders of knowledge can be potentially transformative for Latinx adolescents in engineering. The principles of *Rasquachismo* are rooted in understanding the wealth of knowledge that students bring to the classroom, validating and valuing their embodied knowledge, and foster students' inquisitive nature.

Conclusion

Although a robust corpus of literature exists on the effectiveness of engineering activities in STEM learning, deficit models still persist in classrooms, thus perpetuating the idea that students

of color have several “needs.” Re-imagining engineering education for Latinx adolescents from an asset-based approach has a strong propensity to develop a knowledgeable citizenry who understands the importance and value of our human constructed world, while validating and acknowledging the contributions of people of color to engineering. Future work should analyze how *rasquache* pedagogy can be implemented in the classroom and the aspects of this approach that would make it successful.

Ybarra-Frausto’s conception of *movidas and rasquachismo* [22] provides a lens of analysis in which to understand the pedagogical formations of Latinx adolescents as they seek to legitimize their lived realities, their embodied knowledge, and situated everyday practices [15]. Overall, the foundation of *rasquachismo* allows Latinx adolescents to affirm the complexities of embodying a bicultural identity [23], and resist forces that oppress and invalidate their knowledges. As indicated by Mendoza, *rasquachismo* also challenges dominant interpretations of what is knowledge and how knowledge is constructed [15].

Our approach of *rasquachismo* is innovative because it validates the assets of the students. It acknowledges culturally and historically accumulated knowledge, skills, and practices of students while creating bridges to engineering and classroom experiences. It is also comprehensive because the goal is to improve academic achievement while helping students maintain their identity, connect to their communities, develop a sense of shared responsibility, share their “sensibilities,” and develop critical consciousness. Through a *rasquache* approach, students will see themselves and their communities in a curriculum that is empowering, transformative, and liberating. The goal would be to replace individualistic perspectives with more cooperative and active roles from the students and teachers.

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