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Influences on Displaced Engineering Student Professional Identity Development: A Scoping Literature Review Across Forced Migration Contexts

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Introduction

Displaced students, forcibly uprooted because of major traumas like civil unrest, poverty, and related disasters, are unafforded opportunities to pursue engineering at alarming rates [1][2]. For example, as of 2022 only 5% of refugee students attended college compared to a 41% global average. Additionally, despite increasing displacement rates from climate change and unrest, fragile contexts' demands for engineering, and the known challenges of identity development in migration, disparities in engineering are often unreported, and displaced engineering students' experiences and professional identity development are not well understood [3].

This gap in understanding is concerning because positively formed professional identities gain engineering students entry into communities in their field, and it is well-known in that transitions to new institutions and the identity development thereafter can be tumultuous for transfer engineering students. Challenges arise due in part to disciplinary norms like rigid and lockstep curricula that make disruptions problematic, as well as engineering culture, and the way connection to and sense of belonging with field-dominant peer groups is crucial to success in the major [4][5][6][7][8].

Displaced engineering students are transfer students themselves, navigating these known issues of the field and learning what it means to be a professional, but they have also often faced trauma; in parallel, they are developing in a foreign learning environment where societal norms, culture, and language differ from their homes in ways that are often challenging as they define a career path for themselves [9][10][11]. Environments of xenophobia and stigmatized notions of displacement are common, and they leave displaced engineering students particularly vulnerable to professional identity formation and production challenges. Though relatively unresearched, displaced engineering students' professional identity-related experiences are different from their domestic and non-engineering peers, and they highlight hidden narratives of the broader engineering transfer student experience.

These dynamics amplify the importance of a better understanding of how displaced engineers construct positively formed professional identities as well as what influences displaced engineering students' abilities to author and reconfigure their identities as professional engineers. In response, and to guide future data collection and research, this scoping literature review is grounded in social cognitive learning theory and seeks to understand the current state of research in displaced higher education student identity development; synthesize the salient impacts of displaced students' expected career outcomes, social experiences, and educational and professional contexts in resettlement; and highlight engineering-specific influences on displaced engineering students' professional identity development. The research questions are:

(RQ1) What are the research-identified influences on displaced student professional identity development, and how do they relate to students' outcome expectations, social experiences, intrinsic factors, and educational/professional contexts?

(RQ2) How do these influences on professional identity development differ for displaced engineering students?

(RQ3) How do these influences on displaced engineering students' professional identity development differ from students in place?

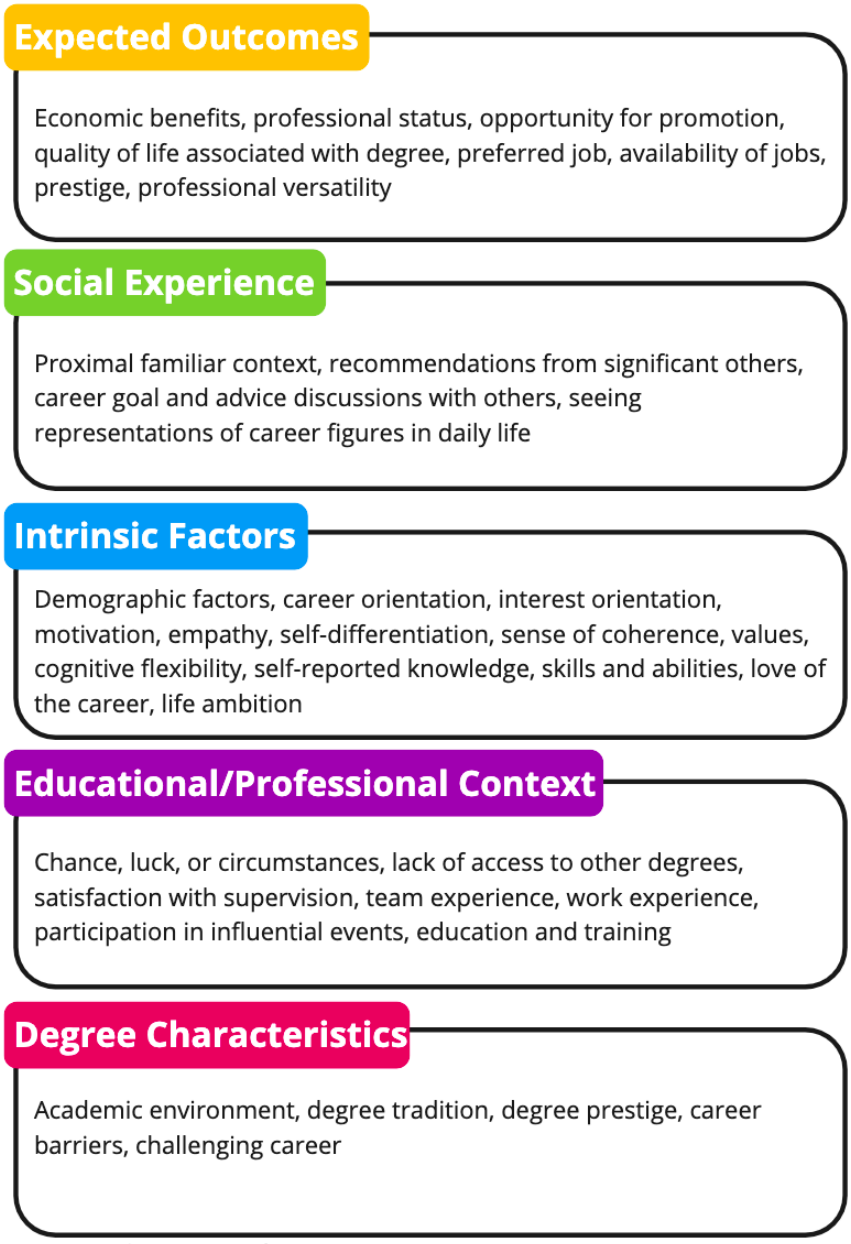
The intent of asking these questions is to point out key gaps in research on displaced engineers, highlight structural areas of improvement for administrators, educators, and researchers, and distinguish critical ways in which engineering environments exacerbate challenges displaced students face as they develop professionally. Examining these influences helps to fill gaps related to existing displaced student literature's focus on single-site, discipline-specific (and usually non-engineering) studies, as well as transfer engineering student literature's lack of disaggregated studies of specific student and displacement/trauma-related experiences. This work informs future research on the experiences of displaced engineering students and the development of engineering programs for displaced students, and it highlights the how influences on displaced engineering students' identity development are structural, embedded, and compounding, particularly because of the culture and historical norms of engineering.

Conceptual Framework

From a social cognitive perspective of student development [12][13], engineering students' learning includes developing their professional identities in addition to their regularly scheduled expertise [14][15][16]. Social Cognitive Career Theory (SCCT) states that a students' career development process comprises a student's interests, goals, self-efficacy, behaviors, and outcomes, and their development process overall is mediated by both internal and external influences, such as personal background, life events, and surrounding environments. Lent and colleagues [17] suggested that researchers use SCCT to study the influences on specific aspects of higher education student development to identify supports and barriers to this process.

One study that has used SCCT to theorize identity development at the university level guides this work; it is Barbarà-i-Molinero et al.'s [18] integrative conceptual framework on the factors that influence the professional identity development of higher education students. Researchers conducted a review with experts that identified influencing factors on professional identity development for higher education students and shared a framework for influences on professional identity development of higher education students, including expected outcomes, social experience, intrinsic factors, educational context/professional experience, and degree-specific characteristics. See Figure 1 for an overview diagram. One benefit of this model as a basis for this study is that it includes the nuanced cultures of, and experiences associated with specific disciplines. This is particularly important for this study on the influences on displaced engineering professional identity development specifically as opposed to across fields, though there are few studies on the influences on professional identity development for displaced higher education students in general, let alone those in engineering.

Figure 1: Influences on Professional Identity Development of Higher Education Students



Adapted from Barbarà-i-Molinero et al. (2016)

Methods

Considering this study's objectives and research questions, the wealth of displacement professional identity development studies, and the absence of displacement engineering programs and disciplinary-specific research, this work takes a scoping literature review approach and includes analysis across disciplinary boundaries. In other words, displaced student professional identity development literature was reviewed across disciplines, but the primary focus of analysis was on how engineering-specific identity development experiences differed

from previous work on displaced college students more generally. That said, because of the large breadth of research on displaced students outside of engineering as well as the long history of variability in how institutions and individuals define and describe displacement and the experience of it, we employ a broad definition of displacement in this study. We operationalize displacement in data collection and analysis based on 'words of interest' generated in data familiarization, with keywords defined below. This approach is aligned with the exploratory nature of this literature review and efforts to explain the experiences of displaced engineering students and their identity development.

The review draws on articles from 199 publications within the EBSCO Education Full-Text Database from 2001 to 2021, using the iterated search string selection inclusion criteria of "(refugees or asylum seekers or displaced or migrants or "natural disaster") AND ("professional development" or "professional learning" or "professional training" or "professional education" or "professional identity" or "professional identity development" or "Career development") AND (university or college or "higher education" or post-secondary or postsecondary or undergraduate or graduate or PhD) AND students."

A librarian's expertise was helpful in this search process; researchers used seminal articles to test search strings for validity, and papers were screened for a focus on displaced students, higher education, and professional identity development. In doing this, the coder also analyzed each piece broadly for its relevance to the research questions. Ultimately 59 articles passed these different quality screenings and formed the basis for this study; works span different experiences of displaced students including but not limited to refugees, asylum-seekers, DACA recipients, student migrants, other undocumented students, disaster victims, and internally displaced persons. Resettlement contexts include the US, Canada, Australia, Sweden, Ireland, the UK, Germany, Portugal, South Korea, Russia, Taiwan, Scotland, Israel, Vietnam, and an unnamed African country. Some of the home countries included are Syria, Indonesia, Somalia, Iran, Iraq, Zimbabwe, Mexico, China, Dominican Republic, Afghanistan, Sudan, and Ethiopia. In some cases, students' resettlement country is the same as their home country. Studies come from across disciplines, but most are not discipline-specific, and only two are in engineering. The full list of references in this review is included in a previous conference paper [11].

Analysis of these 59 articles happened in 2 phases. First, studies were coded using content analysis [19] focused on identifying influences on displaced student professional identity development and classifying experiences specific to the engineering experience. In other words, articles were broken down by topic into discrete units of data that researchers then categorized. To further answer the research question and more thoroughly link recent research in this area, the second phase of analysis consisted of a deductive coding process with Barbarà-i-Molinero et al. 's [18] framework as an a priori codebook. This effort served to categorize identified units of influences on professional identity development according to research-based themes (RQ1 & RQ2), shedding light on the ways in which professional identity development in displacement is and is unlike an in-place educational experience (RQ3). Barbarà-i-Molinero et al. 's [18] theme of Degree Characteristics serves as a lens for investigating engineering-specific influences (RQ2).

Findings

Data analysis from this scoping review gleaned 7 of the most salient categories of influences on displaced student professional identity development in existing text; these influences map onto the categories of expected outcomes, social experience, intrinsic factors, educational and professional context, and degree characteristics [18], and include issues related to the *pressure and credentialism* displaced students face in managing multiple life roles, the stress culture in engineering, and the lack of recognition for their skillsets in resettlement schools and workplaces; the *liminal legality and identity invisibility* that comes with being undocumented, non-traditional, and underrepresented in engineering, and the ways in which political structures and engineering's commitment to being apolitical oppress displaced people and fail to incorporate diverse knowledge into practices; and the *instability* of migration, the layered and implicit *figured worlds* of resettlement engineering that obfuscate hidden curriculum in localized engineering professional norms, and how these hidden figured worlds translate to more overt, structural "*othering*" and discriminatory hiring practices based on the language of and discourse about migrants.

Expected Outcomes and Social Experience

In Barbarà-i-Molinero et al. 's [18] study, expected outcomes as an influence on professional identity development for higher education students describes the economic benefits, status, prestige, and versatility associated with a degree that serve as (de)motivators for students. In other words, the influence of the promise of certain degrees and the careers that follow their attainment affects how students ascribe professionalism. Related to this is social experience as an influence; it describes the impacts of proximal familial context, recommendations from significant others, and seeing representations of career figures in daily life on students' sense of professional self. Ultimately social experience refers to the way family, friends, and other significant others' advice and example impact students' professional development.

Discussed in the following section, this review showed that for displaced engineering students, expected outcomes and social experience were inseparable and had a compounding relationship, particularly for women and other primary care takers. Specifically, displaced students' identity development was critically impacted by relationships between the promise, prestige, and stress culture of engineering, the pressure students felt in navigating often conflicting personal and professional roles in resettlement to meet their family's needs and expectations, as well as the outcome expectations society held about displaced people and credentialism in resettlement engineering workforces. Displaced engineering professionals often found themselves in an endless cycle of needing the well-paying engineering jobs they are qualified for back home, not being recognized as valuable by resettlement employers, and having to go back to school, risking skill atrophy.

<u>*Pressure*</u>

In a technical sense, pressure refers to a force exerted over an area; just as pressure is the total sum of the forces over a surface, so too was pressure a sum of displaced students' balancing multiple competing roles over their higher education experience. Pressure was a strong an

influence on professional identity development for displaced students in this review, and it related to the intense burden students felt to prove themselves amidst the multiple competing forces they were expected to handle in a resettlement context [20]. This pressure was linked to student's outcome expectations, that of their social circles, and the influences of significant others' experiences and advice, and it involved the compounding effects of the multiple roles, expectations, and priorities displaced students balance while developing as professionals.

One way pressure manifested itself is in displaced students' responsibilities to fulfill family obligations and work paying jobs in addition to schoolwork; while many students in host countries had the luxury of undivided attention for their studies, most displaced students in this scoping review juggled added expectations outside of school because of the stress, unpredictability, and poverty associated with resettlement. Authors across contexts described displaced students not only facing familial expectations for attending university and specifically seeking high-paying jobs [21], but also for providing financial and other assistance to them now and in the future [22][23]. As a result, students stressed under the pressure to pursue certain studies and be successful and to make their family's sacrifices "worth it," making it difficult to pursue what they enjoy, maintain good mental health, and develop a positive sense of professional identity [24]—what is particularly concerning is that authors commonly noted displaced students "experience depression, anxiety, and fear related to… sending back enough money home to support members of their families" [25] (p. 294).

These effects of pressure were particularly true for displaced students who are women; according to Wu and Wu [26] (p. 144), "the multiple, intensified roles of these women as wives, mothers, higher education learners, and workers created great distress for some of them… it seems impossible to meet the needs of both institutions simultaneously." In a study of foreign-born immigrant undergraduate women hosted in the US institution, authors provided three examples– that women displaced students often were unable to participate in common college activities, particularly social ones, because of their added expectations inside the home, that many of women students opted for majors that lead to specific occupations (e.g., STEM, business) options rather than others (e.g., theater, history), and that women in these situations often felt conflicted because of competing messages and expectations of women across contexts [21]. For displaced students who are women, cultural expectations associated with caring for families were often in conflict with expectations about women having careers; changes in these expectations across contexts have a strong influence on students' decision-making related to professional identity development.

Both the nature of the engineering field and its potential for high-salaried jobs after graduation exacerbated the pressure displaced students experience in developing professional identities, particularly those who are women and other marginalized students in the field. Engineering degrees are a significant expression of social mobility and capital [27], particularly for displaced students who face a mismatch of expectations upon [21], making engineering majors in high demand for these students seeking to provide for their families [9][28]. The multiple roles these students played and the pressure to make every right decision compounded. Despite high demand from non-traditional students, engineering's inflexible and heavy course requirements, expectations for low or unpaid work experiences like internships and research assistantships, and general lack of representation of students who have competing responsibilities [29][39] made it a

particularly challenging field for displaced students professional identity development.

For authors in this review, these dynamics for displaced engineers were related to what Godfrey and Parker [31] refer to "the engineering way of doing," which describes to the normative beliefs and assumptions made about how engineering *should* happen. One such belief is referred to as "hardness" -- it permeates engineering curriculum and is the assumption that engineering should be hard or difficult, and that the workload should be intense [4][32]. This review gleaned that little room was left in the engineering curriculum for the flexibility that displaced students often needed as they acclimate to a new context, meet personal obligations, and progress in their degrees. In essence, both displacement and the engineering field itself created pressure for displaced students; it first came in the form of multiple competing roles and responsibilities, but engineering brought in the second wave with pressure created by "engineering ways of doing" and stress-culture [31][33].

In summary, pressure highlighted the compounding nature of influences on professional identity development for displaced engineers, the ways in which expectations of professionalism differed and conflicted across displaced students' social circles, as well as the importance of taking intersectional approaches to this work. Displaced students are non-traditional students in engineering, and they are juggling often conflicting expectations in high stress environments.

Credentialism

The second way that outcome expectations and social experience intermingled as influences on displaced student professional identity development in this review was through social expectations migrants, their credentials, and value in resettlement workforces and the way these discourses had trickle-down effects on displaced students' personal and professional lives. Specifically, researchers in this review noted the emphasis of status based on academic credentials within professional and social circles in resettlement contexts; this was also described as credentialism, and its embeddedness in society challenged displaced student professional development and forced re-credentialing and further education [26]. Credentialism was particularly relevant for displaced students because many of them already had diplomas that were just unrecognized by their hosts [25][34][35][36][36], resulting in trends where hiring institutions took little account of displaced persons' educational and occupational experiences from their countries of origin. Researchers reported employers assuming a limited transferability of displaced students' skills and courses from one context to another, intense and prohibitory bureaucratic procedures for validation of foreign credentials across the world, and debate over the presence of discrimination and undervaluation of displaced students' skills and formal education [38], all of which served to prevent displaced students' positive sense of professional identity and force professionals to become students again.

Credentialism showed that for displaced students, expected outcomes and social experience issues were not just relevant to their forced reeducation and identity development now; issues of recognition as professionals, society's expectations about migrants, and abilities to find meaningful work continued to be relevant throughout their early careers. Researchers in this study parsed that credentialism was linked with occupational downgrading, which happens when a person's occupation post-displacement does not match their education credentials and previous

work experience [26][37][39]. Participants in the studies in this review reported that few displaced students manage to reposition themselves upon resettlement for their desired career [40] and instead make frustrating attempts to be recognized as professionals [37][41]. As an example,

> In multicultural Australia it is commonplace … to know someone from overseas who is qualified and trained in a profession but cannot practice because their qualifications are not recognized. Optometrists become taxi drivers, social workers become hospital cleaners, teachers become clerical assistants and environ-mental engineers stack supermarket shelves. [36] (p. 50)

Occupational downgrading such as this resulted in displaced students' need for recertification (usually involving higher education) and a job to pay the bills, meaning they were unable to go to their intended career work right away and must manage school and work. For other highly skilled students, displacement meant a loss of social status, and detachment from a professional community [34][41] and, troublingly, occupational downgrading and the subsequent loss of professional networks and roles was often a lengthy and demoralizing. Scholars reported that this vicious cycle of non-recognition, the need for recertification, potential skill atrophy, and loss of employment opportunities were critical challenges to displaced students' ability to develop professional identity [36].

These recognition-related and credentialism issues were particularly difficult barriers for displaced engineering students, whose experiences were consistently being looked over for being foreign and unaccredited and whose recommenders were not local [43]. Scholars in this review discussed that the engineering fields in resettlement areas tended to value people with advanced (and often nationally accredited) certifications as well as recognition as highly skilled workers within a specific (and often local) professional community [28]; these tendencies towards intellectual superiority and smartness based on local dominant norms of merit were problematic for displaced engineering students and their adverse effects discounted discounting displaced engineering students' degrees [43].

An example, Ingram et al. [28], in their study of international engineering graduate students in Canada, found that students perceived the country's requirement of a year of Canadian engineering education experience to be eligible for licensing to be the foremost barrier to career integration and career development for displaced engineers. Policies like these, which showed how various sources of knowledge (i.e., degrees from differing institutions/nations) are valued differently across contexts, impacted displaced people at all levels of engineering.

In essence, credentialism as an influence on displaced engineering student professional identity development exposed the way these recognition-based issues, typically at national levels of engineering certification, were relevant not just in schooling, but also before and after these students' education (and re-education).

Intrinsic Factors and Their Interactions with Resettlement Policies, Practices, and Procedures

Barbarà-i-Molinero et al. [18] describe intrinsic factors on professional identity development for

higher education students as consisting of a students' career interests, motivation, abilities, confidence, as well as demographic factors. This scoping review showed that for displaced engineering students, while all these intrinsic influences were relevant to these students' professional identity development, those related to demographics, and the way demographics and context interact, were most salient and had the greatest impact on students' future career goals, abilities, and confidence. The most cited intrinsic influences for displaced engineering student professional identity development today were liminal legality and identity invisibility, as well as their relationships with citizenship, the rights and privileges associated with being a citizen, the engineering fields' relationship with regulatory bodies and their citizenship documentation, and the social identities and marginalization of displaced people.

Discussed in the section that follows, this scoping review revealed that when it comes to studying displaced engineering student professional development, though demographics, identity itself, and other factors are intrinsic, it is difficult to separate them fully from extrinsic, and specifically structural, factors related to identity politics in resettlement areas that are spread across multiple layers of students' academic environments. In other words, intrinsic factors related to demographics and identity were heavily influenced by context because these factors that influence professional development for displaced students interacted with government immigration, identification, and documentation laws, as well as academic institutional structures and policies.

Liminal Legality

Liminality, first conceived by anthropologist Gannep [44], is marked by liminal periods which involve a state of flux [9]. Turner [45] describes liminality as being "structurally invisible" because in liminal periods, a person's sense of identity and self do not fit into existing categories within a social sphere. In this review, displaced students experienced liminality in terms of their professional identity development because their multiple shifting identities (or demographics) in resettlement often differed from the norms around them and were connected to the identification and documentation statuses that grants civil rights; this liminality at a national and political level had a strong and cascading impact on displaced students' career motivations, goals, and pathways.

Scholars in this scoping review extended the idea of liminality to liminal legality, a barrier to positive professional identity development where displaced students "occupy an in-between status, one that is neither legal nor 'illegal'" depending on their documentation status [21][46][47][48]. Liminal legality captures displaced students' uncertain status, the role governments play in documentation and employment, and the ways that lack of opportunity impacts displaced students' career orientation and sense of confidence. Liminality, as well as the lack self-efficacy that resulted from employers requiring citizenship status, impacted displaced students personal and professional identity development because it limited displaced students' range of possibilities in social and career spheres, exacerbated their motivation and confidence issues, and put their existing career orientation at stake [46].

As examples of the impacts of liminal legality, DACA recipients in Ortiz and Hinojosa's study [49] expressed frustration in their inability to find formal, paid job opportunities and to apply for

medical and law school entrance exams due to their unsteady citizenship status, and other students noted the changing nature of immigration policymaking that threatened undocumented students with temporariness. In another study, a participant, Alysa, said "'I heard about the whole graduate school and Ph.Ds. and all that, and I'm like yeah, I want to be a doctor. But then I'm like 'wait, what if DACA gets taken away?'" [46] (p. 327). Her question, along with others, highlighted the effects of political threats on a displaced students' liminal legality and professional identity; they reified one's in-between status, espouse its temporariness, and made looking for work seem futile [21]. These students' experiences also showed that, liminal legality and hiring based on demographic differences made displaced students automatically ineligible; in this way, these practices served to systematically disadvantage displaced students from gaining the experience necessary to develop a professional identity.

Liminal legality was inseparable from displaced students' intrinsic factors in this review because, despite the involvement of society and discourse about migration, liminal legality was extremely connected to an individuals' demographics, identity formation, abilities, and confidence, just within a given context. Nuanced findings suggested that for displaced students, it is difficult to fully draw a line between intrinsic and extrinsic factors related to resettlement places on professional identity development; context and sense of place were inseparable from identity and individuality, particularly when the government identifies and documents people before granting employment and civil rights, and when some countries are associated as being more welcoming to immigrants than others.

Liminal legality as a barrier to professional identity development was especially relevant for displaced engineering students, who were often seeking careers that are governed by regulatory bodies and expecting work experience prior to graduation. Engineering finds its roots in military spending [49] where jobs require security clearance, and outside of defense, where clearance is not required, licensure often is. Scholars in this review suggested that regulatory bodies and their expectations about citizenship act as gatekeepers for displaced engineering students working to become professional engineers in that the possession of proper citizenship documentation is a prerequisite for applying for further credentials, internships, and jobs [40][46]. In engineering there is a particular focus on the necessity of internships and other structured work experiences prior to graduation; researchers have found employers believe that such experience is the "only factor that makes a significant difference" in employability [50] (p. 825). For displaced engineering students who have not been able to find internship opportunities, entering the job market was significantly more challenging, and there was not a clear way for these students to gain the experience they need [28]. Displaced engineering students were stuck in a loop of not being able to find internship opportunities and then not being able to find full-time work because they did not have an internship.

This influence on displaced engineering professional identity development, liminal legality, revealed the way in which intrinsic factors of identity were heavily mediated by and difficult to separate from the extrinsic factors of identity politics and the structures of place that created systemic and cascading barriers for migrants; nationally based regulations over documentation, citizenship, and hiring practices for immigrant engineers forced displaced engineers out of work.

Identity Invisibility

The second set of influences on displaced student professional identity development related to these intrinsic factors and their intertwined relationships with context and politics were associated with identity invisibility. Identity invisibility is multidimensional, but overall, in this review it referred to the ways higher education structures and demographics in a resettlement area rendered displaced students "invisible," based on their social identities, whether it was in the lack of concern for people seeking refuge in immigration laws or school planning and policies. This influence primarily impacted the types and levels of support displaced students received upon arrival to their resettlement institutions, but it also had to do with the invisibility of displaced peoples' experiences and knowledge in academic literature and other formalized structures. Identity invisibility impacted displaced students' professional identity development because it meant educators and institutions were relatively unaware of students' distinct needs, learning spaces were not designed with them in mind, and their narratives/experiences were homogenized by others.

In terms of identity invisibility's manifestation within academic structures and its impact on support for displaced students and their development as professionals, scholars commonly noted how identification documentation and the lack of tracking information on displaced pupils resulted in limited university support and numerous bureaucratic barriers to participation. For example, oftentimes students who were forcibly displaced arrived in resettlement areas without their transcripts and other educational records on-hand, and schools in both contexts were unprepared to share and receive this necessary information. These dynamics halted student enrollment and left displaced students invisible in school computer systems, not just in international cases of displacement, but also in national and even within-state cases [10][34][51][52][53][54][55].

These circumstances meant that displaced students often went unclassified as a distinct social group from other students and their needs and backgrounds were unaccounted for in school. As examples, in Morrice's 2013 study, refugee professionals enrolled in university were classified as international students and, as a result of a separate classification for asylum-seekers, had to pay higher fee rates [56], and Shelton and Thompson [57] mentioned in their study of students displaced by Hurricane Maria that professions showed a lack of concern by not proactively acknowledging the hurricane in classes and the ways in which individual students were affected afterward. In other words, computer systems and their lack of ability to share educational identification and tracking information on displaced students had trickle-down effects on displaced students' participation in higher education; their experiences were homogenized with that of others', preventing students from bringing their whole selves to their learning and identity development. These same issues of homogenization were not limited to academic institutions and their computer systems—they were also relevant in the workforce and migration literature.

This homogenization and marginalization of displaced student identity-related experiences was also extended beyond academic institutions themselves towards other formalized structures with power over migrant experiences. As an example, scholars in this review noted that very few researchers studied displaced students in the first place, and even fewer considered the broad spectrum of displaced students backgrounds in their work. This made it difficult to support

diverse students and to draw conclusions as the role that different forms of displacement have on professional identity development [39][58][22][59][60][61][62], in addition to the ways other layers of identity like race, class, (dis)ability, gender, and documentation status interact with this experience. These issues are mirrored in policymaking about immigration and the workforce that does not take a community-engaged approach—without diversity representation and inclusion of the knowledge of resettling constituents, displaced peoples' experiences are homogenized, supports for their workforce integration are designed exclusively, and structures (i.e., policies) do not respond to the diverse experiences of migration.

For displaced engineering students, identity invisibility challenges to professional development were exacerbated by the "boundary status" they negotiated in engineering communities [63] as well as the apolitical culture of the field [64]; this boundary status stemmed from and was perpetuated by the fields' chilly climate that is inconducive to women, people of color, and other marginalized groups [65][66]][67][68][69], as well as engineering's commitment to separating the technical from the social—assuming that math and science are "race and gender-free" [31] (pg. 10). Scholars in this review noted that the engineering field commits to being apolitical meaning that it prioritizes ways of thinking associated with its white, masculine, and elite culture; this made displaced engineers with intersecting marginalized identities a minority within a minority [9] [33][69][70][71], and it allowed educators of displaced engineers to ignore the impacts of politics and social issues. Displaced engineering students in this review because of accumulated advantages, domestic, white, male, upper-class students often received positive socialization over others and support structures seemed to be designed with these engineers in mind [72]; additionally, students noted that since political issues were considered separate from the technical, displacement experiences were considered irrelevant to engineering. These dynamics highlighted how the fields' cultural commitment to ostensible objectivity compounds and creates systemic disadvantages for displaced engineering students.

In summation, identity invisibility and the dominant, apolitical culture of engineering marked by support structures designed for the average engineer (i.e., a domestic, elite, and white man) means that displaced engineering students' narratives and knowledge are not being incorporated into the policies, practices, etc. that affect them most, and that engineers are unlikely to respond.

Educational and Professional Context

In Barbarà-i-Molinero et al.'s [18] study, educational and professional context as influences on professional identity development include students' ability to choose certain careers, their relational experiences with supervisors and teams, as well as their prior work experience and participation in influential education and training events. In other words, it primarily consists of the experiences students have had in school and professional socialization both before and during college, their interpretations of those experiences afterwards, as well as the relationships and/or tensions between their educational and professional contexts before and after displacement. That said, these scholars also note that part of a students' educational and professional context includes additional circumstances that impact professional identity development; they describe these factors as related to chance or luck.

Presented in the following section, this scoping review showed that, for displaced students, these

chance-related circumstances were heavily linked to their migration, and students' experiences in their new educational contexts are marked with instability and the often difficult-to-interpret nature of their migration. Ultimately this influence on displaced engineering student professional identity development stressed the way that these engineers' surroundings and experiences in them are heavily linked to the unstable and often difficult-to-interpret nature of their migration and resettlement. Students' agency was limited by their lack of control over their career choices, and mental health takes a toll, highlighting the importance of an engineering culture that is flexible and supportive of lowering stress levels. That said, instead, engineering culture is marked by rigidity, lockstep processes, and the dominance of certain engineering students and certain ways of being that are often embedded and implicit. This means that educational and professional contexts for displaced engineering students are not just unstable, they are also marked by layered figured worlds that benefit native-speakers and dominant student identities disproportionality over those who are resettling and speak with accents. The main themes related to this set of influences on displaced engineers' professional identity development included instability, figured worlds, and othering through discourse.

Instability

The first way authors discussed the educational context of displaced students is as one influenced heavily by uncertainty and instability, both in terms of living situations and professional identity formation [22]. Students throughout this review described that they must be constantly adaptable and hard-working to establish some semblance of control over their lives, and scholars pointed out that displaced students' sense of self is fragmented and constantly changing as students make importance choices related to immigration, traumatic events, challenges in the workplace, and the milestones they achieve amidst uncertainty [21][37]. In Morales Hernandez's [46] study of 154 undocumented college students seeking paid and career-relevant work, Victoria H said, "Whew. (Laughs). [Discussing my career plans] makes me feel nervous. It gives me anxiety because I don't know what's going to happen" (p. 318)

Displaced students in this review often had to strategically redirect their careers multiple times throughout resettlement, often in ways that limited their potential number of opportunities and associated identity development [48]. Whether it was caused by social pressure to take on high-value careers or to tend to family [22], the job market, need for money and documentation [37], or discrimination towards displaced people [60], displaced students were disadvantaged by the lack of opportunities they faced with uncertain career plans [73][74]. In addition, this instability and lack of ability to choose freely from all pathways available translated into displaced students reporting high levels of anxiety, depression, and PTSD, amongst other mental health issues [34][39][73][75][76]. The lack of control over choices associated with building a career as a displaced person revealed the limitations on students' decision-making and agency in migration, and the ways in which their positive identity development rested on having access and therefore control over paid, and both career- and professional identity-building work opportunities.

According to authors in this review, the instability displaced students experience as they develop their professional identities was even more threatening when students are enrolled in engineering. This was primarily due to the culture of engineering and its focus on efficiency and rigor in the curriculum [31], evidenced by an "efficient and cost-effective transfer of a certain

amount of content in a lockstep process" [77] (p. 258). Engineering plans of study are designed for students in inherently stable situations, and for students like those facing migration and discontinuity in education as a result, the highly structured and heavy course loads associated with engineering were inflexible and at odds with students' ability to control their environment. One class missed costs an engineering student another whole semester or even year of classes depending on an institutions' course requirement sequencing, making it significantly more difficult to pursue a degree in this field compared to some other options with more adaptable course loads [21].

These conflicts between engineering education's structures and culture and the instability of displaced engineering students' educational contexts added to the anxiety and other mental health problems displaced students face. This is especially complicated considering engineering's' "meritocracy of difficulty" [78] (p. 1) and culture of stress related to the lack of sleep, fear of failing, and high levels of competition. Scholars in this review revealed that engineering culture created a space where displaced students struggling with mental health problems were at risk of developing a negative sense of engineering identity and perceptions of exclusion within the field; because of cultural constructs of engineering ability, rigor was used as a tool for exclusion for who is and is not "cut out" for the career [33], and the influence of instability on displaced engineering students' professional development and any associated mental health issues underpinned their experiences of engineering culture and affect their retainment in the profession.

In sum, educational and professional contexts as influences for displaced engineering students' professional identity development are heavily related to the nature of migration and engineering culture, particularly in terms of the instability that stems from being displaced and the conflicts between instability and engineering's focus on lockstep and rigid processes and toxic cultures of meritocracy.

Figured Worlds

The second manifestation of the influence of educational context on displaced students' identity development come from the layered figured worlds and the conflicts that result from differences in professional norms across the contexts displaced students navigate in resettlement. Figured worlds, emanating from Holland, Lachicotte, Skinner, and Cain are "socially and culturally constructed realm[s] of interpretation in which particular characters and actors are recognized, significance is assigned to certain acts, and particular outcomes are valued over others" [79] (p. 52). In terms of displaced students' professional identity development, figured worlds came in the form of new professional contexts in resettlement that bring "hidden curriculum," dominant worldviews, and cultural nuances [80] that challenge displaced students seeking entry into professional spaces in culturally diverse places. These figured worlds were layered and revealed that influences on professional identity development for displaced engineering students were not only structural or national in nature—they were also governed by larger cultural and ideological trends across geographical borders.

Specifically, scholars in this review suggested that not only are displaced students tasked with decoding the unsaid standards of their field, but they are also doubly laden with the specifics of

an unfamiliar state's professional codes and ways of being, and the way these specifics differ from their learning contexts back home [38][81][82]; these include hidden curriculum around learning to get a job and filling out government forms, differing norms and valued capital across professional spaces, as well as dominant intellectual paradigms about integration and assimilation. Scholars in this review reported examples of displaced students' teachers failing to make explicit specific expectations of students and upholding "an institutional practice of mystery" where higher education fails to teach the conventions and "common sense ways of knowing" [23][34]. These embedded practices resulted in displaced students feeling unable to decipher the standard assumptions and social cues associated with their intended career in a new context, limiting their professional identity development.

These hidden norms were all compounded by engineering ways of thinking and doing as well as the marginalization of diverse people in resettlement educational contexts and their associated engineering workforces. Authors in this review noted that engineering culture privileges colonial, white, and masculine qualities such as independence and focus on achievement, and engineering practices are often marked by implicit western-democratic assumptions of hierarchies [9] that are unfamiliar, implicit, and challenging to immigrant students. Researchers noted that in resettlement engineering education and workplaces, information sharing was typically mitigated by one's culture position on the individualism-collectivism spectrum, creating tensions for migrants with different cultural approaches to professionalism and a lack of familiarity with resettlement norms. Displaced engineers commonly noted challenges with navigating appropriate information sharing with colleagues across their organizational hierarchies; it was difficult for them to decode implicit expectations around sharing information on an as-needed basis or always opting to share beyond those directly impacted, and these daily behaviors impacted performance reviews. Similar cultural tensions arose related to differences in risk-tolerance and its overtness across engineering cultural contexts; in addition to deciphering communication standards, displaced students were also tasked with negotiating and interpreting how engineers in their resettlement environment determine the amount of precision and data required to move forward in decisions and to problem-solve [28].

Figured worlds as an influence on professional identity development reveals the way educational and professional contexts displaced engineering students operate within are characterized by embedded or implicit expectations of professionalism that are localized and particularly difficult to navigate. These figured worlds are layered and differ across context, meaning that tensions arise from these conflicting approaches to professionalism in ways that are particularly difficult to detect. As a result, cultural conventions about what it means to be an engineer in resettlement are easier for domestic students and other dominant demographics in engineering to interpret compared to those experiencing displacement; in this way, figured worlds and their hidden curriculum create environments designed for only some engineers to navigate seamlessly.

Othering Through Discourse

The third aspect of educational and professional contexts' influences on displaced student professional identity development were related to the dominant cultural nuances and worldviews of figured worlds, but instead of being hidden, othering through discourse bubbles up to a much more public surface. Othering through discourse as an influence included the way discrimination,

othering, and language are heavily linked in migrants' identity experiences within this review. It involved stigmatized/xenophobic rhetoric about migrants, hegemony of certain languages in resettlement contexts, and discrimination against foreigners based on language, which all had adverse impacts on displaced students' abilities to find and maintain work, feel belonging, and develop a positive sense of professional identity in engineering.

As alluded to before with identity invisibility, scholars in this study often discussed the impacts homogenized rhetoric about displaced people has on their experiences—this influence of othering through discourse also included the dominant stigmatized nature of migrant rhetoric as well; a xenophobic environment in resettlement environments was not uncommon, and it often lent itself to the isolation of displaced students and the denial of their cultural identities. Critical researchers described resettlement communities as being familiar with terms like migrant, refugee, and asylee as marks of the 'other' or a deviance from the norm, at a lower status [38][39][53][82][83][84]. In one study of international students in Portugal and the UK, authors linked this notion of the racially, culturally, and geographically distant other to the "historical dimensions of European Higher Education expansion as a modern colonial project" [85] (pg. 375), where the majority culture is taken for granted and difference is perceived as otherness.

The "taken for granted" nature of othering related to the hiddenness or embeddedness of figured worlds and their cultural norms—these influences on displaced students' professional identity development were covert, but their impacts (i.e., othering in discourse) rose to awareness in the form of derogatory cultural scripts about migration. These scripts reverberated in students' daily lives, as well as in broader spaces like the news, politics, and research about displacement. Authors in this review brought forward literature's (i.e., both research and the news) tendency to focus on displaced students' so-called individual deficits despite evidence of their agency and success and the influence that context has on resilience [39][57][84][86]. Resorting to thinking in terms of "other," researchers are not immune to blaming displaced students alone for their challenges in resettlement, and equally concerning, neither are hiring agencies.

These othering through discourse practices became structural in and had systemic effects through hiring and college acceptance practices that continually devalued linguistic capital marked "other." Displaced students commonly encountered harmful assumptions based on their accents and host language proficiency, particularly in looking for jobs, and it impacted their abilities to get certification and work in-field. In one study of asylum-seeking students in Australia, authors suggested that "the form of human capital that counts the most [for displaced students] is proficiency in the host language;" [58] (p. 8), particularly because language speaking skills were often eligibility requirements for hiring. In other words, the hegemony of certain languages in resettlement contexts was exacerbated, amplified, and made structural by institutional hiring policies and practices that favored students speaking a dominant language and the perception that non-native speakers with accents are incapable [25][35][37][80][88]. Otherness and discrimination like this made displaced students feel conscious about their language and therefore continually "under pressure to do the right thing, say the right thing, and behave in the right way to help them get inside the circle" [82] (p. 6).

According to this review, othering through discourse is compounded by the dominance of white, male, elite English-speaking engineers in the engineering profession and the features of

engineering discourse that privilege these students [9][28][30][25][73][89][90][91]. Engineering discourse reinforces cultural norms and often features violent metaphors, profanity in the classroom and workplace, and semi-sexual, double-entendre humor; this language dictates culturally appropriate speech and set the tone of engineering teamwork at the detriment of students who do not fit this engineering archetype [92]. One illustrative example of the "othering" challenges that resulted from engineering linguistic culture came from a study on international female engineers in the US [9], where Alice remarked that as the lone women on her project team, she often felt uncomfortable speaking up against her loud and argumentative male peers; her ideas were left unconsidered, and her self-definition of what female engineers can and should be was restricted. Examples like these are concerning because communication is central to the engineering profession, performance reviews in engineering, and success in the field, but these parts of engineering work are socially embedded and based on professional norms that are foreign to those resettling [28].

This influence on professional identity development reveals how stigmatized rhetoric about displaced people and dominant professional language norms in engineering other displaced engineers and prevent them from developing a positive sense of professional identity. Like figured worlds, norms around language and stigmatized rhetoric about migrants are hidden, embedded, and implicit, but these discourses are tools of discrimination that can become overt and structural in hiring practices and research about displaced students. If scholars, educators, and employers willingly and unquestioningly accept racial scripts [93] about migrants or dominant ideas about what accents are professional, then harmful perceptions about immigrants will be perpetuated.

Discussion, Limitations, and Future Work

This scoping literature review and the synthesized findings related to influences on displaced engineering student professional identity development show that, across types of displacement covered in literature today, the culture and structures associated with engineering complicate, exacerbate, and compound displaced students' identity related experiences -- from its emphasis on hardness, intellectual superiority, rigid, lockstep course requirements, hidden curriculum, and violent, profane discourse, to its intertwined relationship with national accreditors and political structures affecting employment. The work extends previous inquiry by synthesizing influences on professional identity development for displaced students more broadly, including these engineering-specifics, but it also reveals the ways in which displaced engineering students' identity development is deeply influenced by often unstable changes in context and contextually based professional expectations and workforce-related identity politics. In other words, displaced engineering students' identity development is influenced by shifting, connected, compounding and often conflicting figured worlds guiding what it means to be an engineer, and being a migrant in resettlement often involves the marginalization of displaced people's ideas about professionalism in foreign engineering environments.

Influences on professional identity development for displaced engineers span phases of migration and change across contexts, are intersectional in nature, and are embedded in structures that have implicit, but systemic effects that impact all displaced students differently. Since cultures of education and professional development change across geography, as

engineering students are displaced and transitioning into new engineering systems, significant others and their own expectations about professionalism may conflict with now-dominant norms, particularly those related to defining professional language, both inside and outside the resettlement classroom. In essence, and to answer the research questions associated with the study, the most salient research-identified influences on displaced student development today include pressure, credentialism, liminal legality, identity invisibility, instability, figured worlds, and othering through discourse; these influences are contextual, individualized, and structural in nature, and displaced students' experiences are characterized by instability, lack of control, and the negotiation of hidden/embedded expectations of professionalism in resettlement. These dynamics are only compounded for displaced engineering students, whose identity development experiences are exacerbated by the nature of the engineering field.

These findings corroborate and extend previous research on transfer; first, they reveal the ways in which increasing globalization and displacement spur the need for education-related communication across borders, more globalized forms of accreditation, and consideration for the ways identity politics impact transfer student experiences across demographics, not just displaced students. In addition, they highlight the need for more study of the transition experiences of displaced engineering students and displaced engineers outside of school, as well as transfer research in general that is disciplinary-specific, disaggregated, highly contextualized, and intersectional in nature. Research efforts like these need to empower displaced students and highlight the agency displaced engineers have and the ways it is being taken away from them in unstable conditions, as opposed to assuming deficiency; they also need to challenge the ways in which engineering (and/or other dominant) cultures and hidden ideals exacerbate marginalized students' experiences. Critical approaches to research in this space are particularly useful because of the hidden nature of engineering communities' assumptions about professionalism and displaced people, and the ways in which these expectations become embedded in structures that create systemic inequities for those resettling.

With all of this in mind, there are key limitations to this work; they primarily relate to the literature review approach to this research, the lack of engineering-specific studies to date, and the choice to take a use a broad definition of 'displacement' in this review. In other words, this work is limited in terms of its choice to group multiple forms of as well as multiple stages of displacement together– the influences on displaced engineering student identity development are so context dependent and change over time, suggesting the need for more data collection and from displaced engineers themselves and primary-source data that is disaggregated and longitudinal in nature for studies in the future. In addition, there is need for further theorization of displaced student identity development, critical; community-based, and participatory approaches to these studies; as well as specific study on a variety of types of displaced engineering students to highlight the ways in which context impacts these theories.

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