Theorizing the Politics of Identity in Engineering: Reflections From the University of Tehran, Iran

Sepehr Vakil, Northwestern University, sepehr.vakil@northwestern.edu
Elham Beheshti,The New York Hall of Science, ebeheshti@nysci.org

Abstract: This study investigates the politicized identities and experiences of engineering students at the University of Tehran during the 1990s. Building on sociocultural theories, we offer a unique theoretical perspective on the politics of identity that foregrounds the geographical, historical, and political specificity of identity production. Drawing on retrospective life-story interviews conducted in Farsi, our analysis focuses on the cases of Kamran and Sanaz. We find that for both individuals, albeit in very different ways, engineering offered a specialized status and expanded opportunity in society. We note historical and political resonances in their experiences. This study has implications for and aligns with recent calls to deepen international and historical perspectives on identity and learning in the STEM education and learning sciences communities.

Introduction

We begin with a critical question regarding common stereotypes regarding engineering and engineering students. Why is engineering widely viewed as a dispassionate intellectual endeavor, and engineering students universally known to be socially awkward, "nerdy," and politically ambivalent? But, wait, before we can answer these questions, we must also ask: who is the assumed audience for which these stereotypes are self-evidently true, and from where do these stereotypes originate? We ask these questions as US-based learning scientists and STEM education scholars born in Iran. Our study begins with a conceptual observation that perplexes our friends and colleagues in the US: In Iran, not only do engineers enjoy a far greater esteem and professional and cultural status in society, engineers and engineering students in particular have been front and center in revolutionary struggles over the past several decades. For instance, to be an undergraduate engineering student and a student activist poses no contradictions in the cultural context of Iran. Using this observation as a conceptual starting point, the study described in this paper investigates the cultural production of political identity amongst engineering students who attended the University of Tehran in the 1990s, a politically tumultuous decade in recent Iranian history. Our study aligns with recent calls to deepen international and historical perspectives on identity and learning in the STEM education and learning sciences communities.

Theorizing the politics of identity in engineering

Sociocultural perspectives in the learning sciences have centered the role of identity in the learning process (e.g., Nasir & Hand, 2006; Wortham, 2006). At the heart of identity research lies a recognition that supporting learning requires empirically and theoretically rich accounts of who students are as learners and as people, and who they might become through their future experiences in schools and learning contexts more generally. The notion that learning environments can either support or constrain particular kinds of identities, or "imagined trajectories of becoming" (Nasir & Hand, 2006, p. 468) is anchored in theorizations of learning as a fundamentally cultural process (Cole, 1996; Rogoff, 2003). Seeking to build on this work while simultaneously explore uncharted theoretical terrain in the Learning Sciences, there have been recent calls to more explicitly conceptualize and empirically study the impact of power, politics, and ideology on learning and schooling (Booker, Vossoughi, & Hooper, 2014; McKinney de Royston & Sengupta-Irving, 2019). To theorize the *politics of identity*, we begin with Yates & Youniss (1988) who defined political identity as an "outward-looking process in which [students] anticipate their lives as adults and struggle to understand who they are within a social and historical framework." (p. 495) They go on to say, "as part of this effort, [students] reflect on the values, ideologies, and traditions of their communities and the possible roles they will undertake in adulthood." (p. 495) In this study, we take up this broader perspective and shade it by foregrounding how individual processes regarding self and possible futures for oneself are inherently and always politicized (Vakil, 2020). *In the context of engineering, a politicized lens on identity highlights how individual affinities towards and decisions to pursue engineering are conceptually inseparable from the symbolic and material implications of the engineering profession in geographically, historically, and politically specific moments.* In this study, we take up this perspective in seeking to answer the following research question: How did the sociopolitical moment of Iran in the 1990s shape undergraduate engineering students' views of, and experiences in, engineering at the University of Tehran?

A short political history of engineering education in Iran

We situate this study in the history of engineering education in Iran. While this is a complex history, there are several defining features that are particularly relevant for the purposes of this paper. In the early 20th century, the then Shah of Iran was determined to aggressively modernize the country. A critical aspect of his modernization efforts was the establishing and rapid expanding of higher education, with science and engineering departments being at the center of these efforts. The University of Tehran, established in 1934, was a crowning achievement of his reign and quickly earned a reputation as one of the premier engineering institutions in the Middle East. The Shah, however, was perceived by many Iranians as dictatorial and aligned too closely with Western interests.

Many of his modernization efforts were viewed as in conflict with traditional Iranian cultural values. For instance, the expansion of higher education was often coordinated with the explicit support of European and American universities. Aryamehr University (now known as Sharif University of Technology), for instance, was established by the Shah in 1965 with the direct involvement of MIT and fiercely rivaled the University of Tehran as the premier technical institution of the country (Leslie & Kargon, 2006).

As it turns out, the struggle for Aryamehr's identity tells an important story that echoes in the experiences of the Iranian engineers we interviewed for this study. In 1972, Dr. Hossein Nasr was appointed as President of Aryamehr. Dr. Nasr came from a prominent family and by the age of 30, was already a widely respected professor and dean at the University of Tehran. Importantly, he was also MIT and Harvard educated, making him the perfect person in the Shah's eyes to solidify Aryamehr as the shining symbol of intellectual excellence in Iran. However, Dr. Nasr held complex ideas about the role of engineering education in Iran. Under his tenure as President, he infused the curriculum at Aryamehr with philosophical perspectives rooted in Islamic and Iranian history, transforming the engineering school into a national experiment in culturally sustaining engineering education (Interview, Hossein Nasr, 2019; Paris & Alim, 2014).

Methods and context

The historical era that we chose for this study is Iran in the late 1990s when one of the most remarkable and unpredictable presidential elections in recent Iranian history took place. In 1997, Mohammad Khatami, a reformist candidate, won the election in a landslide victory. The day of this election is regarded as the starting date of "reforms" in Iran with Khatami's campaign focused on democracy, human rights, and freedom of speech. Before this date, Akbar Rafsanji had been the president of Iran for eight years (two consecutive terms). Rafsanjani was considered as a pragmatic Islamic conservative and was credited with spurring Iran's reconstruction following the 1980–88 war with Iraq. Transferring power from conservatives to the reformists in 1997 created a great turbulence in the political climate of Iran and in particular in large universities like the University of Tehran.

Design, data collection, and analytical approach

The data presented in this paper is part of a larger comparative nested case study between engineers in the US and engineers in Iran across two historical periods in each national context. In this study, we focus specifically on one of the nested case studies: the experiences of individuals who were engineering students at the University of Tehran during the Khatami era. We've conducted seven phenomenological life-story interviews (Bevan, 2014) designed to understand the meaning of being an engineering student in a specific sociopolitical-historical moment. The interviews lasted up to 2.5 hours and were conducted in Farsi by Beheshti (second author). The interviews were conducted either remotely or in person and were all audio recorded. Beheshti, who conducted the interviews and is more fluent in Farsi, translated the interviews into English. Then, Vakil (first author), who is more fluent in English, simultaneously listened to the audio while reading the transcript and contributed small modifications to the English translation. We then independently open-coded all transcriptions which led to several analytic categories representing our shared interpretation of the data (Emerson, Fretz, & Shaw, 1995).

Our preliminary analysis has led us to focus on two cases, Kamran and Sanaz (pseudonyms), which we present in this paper as our preliminary findings in this study. We draw on these two particular cases because of the critical similarities and differences between the two. While Kamran (a male interviewee) validated our conceptual model of a politicized engineering student in Iran, Sanaz (a female interviewee) presented a contradictory case. Thus, looking closely at these two cases together was an opportunity for us to complexify our theorizing around the relationships between politics, culture, and identity amongst engineering students in Iran.

Preliminary findings

Kamran and Sanaz were engineering students at the University of Tehran in a politically turbulent time in the nation's history. Our comparative analysis has revealed several emergent themes that speak to how their experiences and identities are deeply imbued with political and historical tones specific to their lives as Iranians. We have identified these themes as 1) *status and opportunity*, 2) *political identity and desire to leave Iran*, and 3)

sociopolitical shielding. In this short paper, we focus on how Kamran and Sanaz's identity in engineering was fundamentally tied to their quest for status and opportunity in the uncertain political context of 1990s Iran.

Status and opportunity

Kamran. Kamran was born in Abadan, a border city, and moved to Tehran when he was 2. After graduating from the University of Tehran, he moved to Canada, then back to Iran where he lived and worked as an engineer before ultimately moving back to the US. He currently lives in Seattle and works for a large technology company. Reflecting on his college days, Kamran describes himself as a "cool kid" who wore jeans and a "rebel" who was "always political." In talking through his decision to study engineering, Kamran states, "*In Iran, as an Iranian, being an engineer opens up many doors.*" Interestingly, he locates his decision to pursue engineering as being context-specific to Iran:

> Yes, In Iran. If I were here in the US, no. But if I was here in the US I would have done something else… social sciences, or international something. I had an unusually huge interest in social sciences…But, well, you know, in the context of Iran you become either a doctor or an engineer, and of course engineer was certainly closer to all of these things I've talked about.

Later in the interview, Kamran describes unique affordances an engineering degree provided during the Khatami period, including the opportunity to avoid "sarbazi," the mandatory 2-year military service required by law of all Iranian-born males.

> Things were better between US and Iran. Some US startup had opened up in Dubai and they had opened up an office in Tehran to recruit Iranian engineers. I started working there...The company would buy the engineers' sarbazi and they would go to Dubai and work for this company…Then all of a sudden 9/11 happened. So I had to go to sarbazi afterall. Then I started a start-up in Iran focused on technology design. IC design. There was a buzz…Iran made their first whatever. But then there were sanctions imposed on Iran and everything slowed down, similar to the sanctions now but that was the first wave.

We see here the politicization of engineering at multiple levels. In one sense, in the Khatami era an engineering degree meant access to jobs with US-startups that offered Kamran a way to avoid military conscription. Yet, despite having nothing to do with Iran, the events of September 11 suddenly destabilized the region, reignited US-Iran tensions, and ultimately forced to Kamran to spend 2 years of his life completing his military service. Ultimately, despite this setback, Kamran is triumphant and returns to civil society to start his own technology company. In his statement, "I started a start-up in Iran..there was a buzz..Iran made their first whatever," he exudes a dual sense of personal and cultural/national pride, transferring his own contributions generously on behalf of his embattled nation. Which, as he describes, ultimately suffers yet another setback due to US sanctions.

Sanaz. Sanaz was born and raised in Tehran and came from a well-to-do family. Immediately after graduating from the University of Tehran, and despite much resistance from her family, she moved to the United States for graduate school. She currently resides in San Francisco and is a senior director at a patent risk management services corporation. As mentioned earlier, Sanaz was a contradictory case. She did not espouse a political identity like Kamran, yet nevertheless vividly recounts how the political moment of the Khatami era colored her experience as a student:

> I had no interest in politics, not at all. But being at the University of Tehran would open your eyes to see what is going on. The largest student protest after the revolution happened when I was there…one of the newspapers was forced to close, and then the students protested, and the Basijis invaded the dorms and arrested or killed people. It was a very shocking thing, I remember. We went to see what happened, we went to the dorms, where everywhere was covered with blood. And people started protesting. I remember they closed the university entrance doors to block people from coming into the campus, and so we couldn't also leave the campus. They did this to control the chaos.

For Sanaz, despite not identifying herself as political, the political moment was strikingly palpable in her experience. Another way her time as an engineering student was politicized was in her own rationale for pursuing engineering despite her stated passion for Architecture. Sanaz had reluctantly applied and been accepted to University of Tehran's engineering program, and received much pressure from friends, family, and teachers to accept the offer:

> You know the culture in Iran, maybe it is different now, but in general as a girl, it is a big deal if you study electrical engineering, and on top of it you go to the University of Tehran! It is a lot! I mean, there was not so much expectations from women, back then. I don't know about now, I hope it has changed. This was good for my status in the society. This gave me a status. An identity in the society. Like, you are studying electrical engineering at the University of Tehran. That creates a respect for you.

She goes on to elaborate the significance of engineering in determining her life's trajectory:

> but I should tell you, this changed my destiny! I couldn't have come to the US with an architecture degree ... I couldn't have built this life that I have now, with an architecture degree. So this was my destiny. ... this was the story of how I did electrical engineering … I knew that I could not stay in Iran, and I thought the US is the best place that I could move to. That's the only way to get out. I mean there was no other way to leave.

Discussion and next steps

For Kamran, being an engineering student at the University of Tehran during 1990s Iran was a time of rebellion, excitement, adventure, and ultimately a career pathway that could buy him out of military service. And although ultimately Iran's political instability spoiled his plans, his engineering degree empowered him to return to his work as an engineer, this time as a proud Iranian entrepreneur. For Sanaz, despite her lack of passion for either politics or engineering, being an engineering student as a woman in Iran "gave her status in society." Ultimately, engineering was literally a ticket out of the country. And for this she was grateful.

What can we take away from Sanaz and Kamran's experiences and identities in engineering in light of the political history and specificity of engineering education in Iran? From the Shah's modernization efforts to the struggle for the soul of Iranian engineering as embodied by the political vision of Dr. Seyyed Nasr, what is powerfully evident is that engineering has had a particular significance in the national imaginary of Iranian political and intellectual leaders. To this day, the University of Tehran continues to be a premier engineering institution, as well as ground zero for political agitation and activism. With this in mind, the quest for status that we observed in Sanaz and Kamran appears to mirror the quest for status that Iran aspires towards on the global and national scene. The opportunities they seek as individuals powerfully resonates with the quest for legitimacy and economic and political sovereignty Iran is struggling towards as a Middle Eastern nation increasingly isolated on the international scene. In this way, their identities and experiences as engineering students in Iran were highly politicized. They vibrated, albeit in their own unique ways, with historical tones and political frequencies.

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