# Investigating Professional Shame as Experienced by Engineering Students Who are Minoritized in their Programs

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**Abstract:**

This paper delineates the current status of our study of the experience of shame within engineering education. The overall study uses interpretative phenomenological analysis (IPA) to examine the phenomenon as it presented in individuals (Phases 1.A and 2) and ethnographic methods to understand the social nature (Phase 1.B) of shame. This paper specifically focuses on Phase 2 of the study examining the experiences of shame in engineering students who are minoritized in their departments. We report on findings of this area of the investigation and briefly discuss the broader significance related to the context of inclusivity within engineering educational space.

**Introduction:**

This paper summarizes the major research activities and outcomes of the fourth year of our investigation of professional shame in engineering students, which is funded through the NSF RFE program (NSF EEC 1752897). Specifically, we focus our discussion on nascent findings from our interpretative phenomenological analysis (IPA) on the lived experiences of professional shame in engineering students who were minoritized in their programs according to gender, racial, or ethnic identifications.

Previous literature has explored identity development of engineering students. However, there is little research pertaining to the emotional experience of shame which stems from the interactions between the social expectations of engineering and the individual student. With consideration to theoretical foundations in sociology and psychology [1-8], informed by relevant psychological and sociological literature, we define the construct of professional shame as having four important features: 1) individuals perceive themselves to have failed to meet socially constructed expectations that are relevant to their identities in a professional domain; 2) individuals experience a painful emotional state amid such perceived failure; 3) individuals attribute the failure to meet expectations to an inadequate whole, or global, self rather than a domain-specific feature of a certain identity; and 4) individuals within professional domains not only experience the emotional state of shame but also contribute to expectations that establish the conditions for professional shame to occur. [9-10]. With this in mind, we have organized this study around the following research questions:

RQ1: How do students psychologically experience shame in the context of engineering education?

RQ2: How are these experiences located and socially constructed within the institutional cultures of engineering programs?

RQ3: In the context of engineering education, how do individual, psychological experiences of shame interact with perceived cultural expectations?

To answer these research questions, we organized the study in two phases. In this paper, we will focus on Phase 2 of this study which examines the experience of shame as an individual student (RQ1) within the context of engineering education as a student minoritized in their departments—or constrained as subordinated or underrepresented [11] on the basis of gender, racial, or ethnic backgrounds. In Phase 1 of this study we focused on the majority population-white males through two methods. In Phase 1.A we examined the lived experience of shame as a white male within the context of engineering education using interpretative phenomenological analysis (IPA)[9,12]. In Phase 1.B we examined shame within the same context and population using an ethnographic lens [13-15].

From documentation in the literature about engineering educational culture, we were interested in learning how the overall experience of professional shame as a minoritized student would vary from that of the majority (i.e., White male). The focus of IPA is preserving the unique and detailed ways that an individual is experiencing a phenomenon while packaging it in a way in which its implications are clear [16]. We see IPA to be specifically useful in this context in understanding the experience of minoritized students whose experiences are structurally constrained and often not visible. Thus, this phase of the investigation is important in understanding not only how students in general experience this phenomenon, but the ways in which the engineering educational culture is impactful in catalyzing moments of shame.

We have completed analysis on seven cases in which the participants identified as being from an underrepresented racial or ethnic background. This data set was comprised of two White women, two women of color and three men of color ($n = 7$). This number of participants is appropriate for IPA, which intends to take a deep and narrow, rather than wide and shallow lens in examining lived experiences. These participants were distributed between two universities: the first being a private, religiously-affiliated, teaching-focused university and the second being a public, research-focused university. Our goal in this IPA study is to increase understanding of professional shame in a way that not only stands on its own but also can be analyzed with the total data from the study as a whole to generate a broader understanding of the culture which surrounds the phenomenon of shame.

**Summary of IPA Findings**

The findings of the study of shame in engineering education in these seven participants from underrepresented racial or ethnic backgrounds are summarized below. These findings, which are divided into four themes will be explored further in forthcoming publications.

**Theme 1:** *Searching for confirmation of belonging in the engineering space*

In moments of professional shame, participants connected questions of belonging to their evaluation of self in relation to failure. Their negative, global self-evaluations posed a threat to

belonging within the discipline. In processing this emotional experience, when the student found further messages of exclusion, the professional shame experience was increased and, along with it, the avoidance of connection and repair. However, participants demonstrated resilience to failure when a moment of shame was met with restoration of belonging through connection.

**Theme 2:** *Experiencing identity categorization*

In their engineering education, the participants of the study experienced moments which they felt categorized by their identity. In some ways, participants expressed pride in that the categorization presents an opportunity to represent their racial or ethnic group as successful in engineering. However, participants also expressed that being categorized sent a message that their failure did not solely reflect on the individual but on their racial or ethnic group as a whole. The implications of moments of identity categorization presented in complex and seemingly contradictory ways within the same individual.

**Theme 3:** *Engineering defined by challenges*

Individual constructs of engineering identity greatly influenced our participant's experience of shame. The idea of engineering as an especially difficult discipline consistently reoccurred in personal understandings of failure within their studies. In some ways, participants adhered to the idea of challenges as valuable in bonding with peers. However, the emotional experience of shame created the idea that failure is indicative of a student's overall sense of being good enough to meet the standard and claim that they are an engineer. For our participants from minoritized backgrounds, differences in previous experiences in engineering from White, male peers intensified this phenomenon.

**Theme 4:** *Wanting to be/not wanting to be the engineering stereotype*

Our participants also discussed their own personal relationship with what it means to be an engineer. An interesting duplicity arose between wanting to be the stereotypical engineer as to feel that they were a successful part of the group and wanting to distance themselves as not to be perceived as a caricature of an engineer. In some ways, our participants recognized the flawed and often racially characterized or gendered nature of engineering stereotypes and pushed back to both differentiate themselves and criticize caricatures of engineering students that only resemble White males. However, in other ways our participants defended their claim to being an engineer by accentuating the ways that they do embody stereotypical notions of being an engineer. Interactions with the stereotype were characterized by both a need to conform in order to belong as part of the group and a need to diverge in order to maintain individuality.

**Broader Significance:**

Understanding how students make sense of failure through moments of shame and the evaluation of their own identity as an engineer is key to affecting outcomes for students who are minoritized in their engineering programs. Messages of belonging to counteract the moments of shame

brought on by academic challenges are critical to maintaining engagement and persistence through the challenges of engineering. This work is timely in light of the arise of the uncertainty caused by the COVID-19 pandemic and heightened awareness of systemic racism within institutions. Findings from this study highlight individualized experiences within these structures help to define how marginalization is practically occurring, and, ways that progress can be made towards more inclusive institutions.

## Acknowledgements

### References

[1] B. Brown, "Shame resilience theory: A grounded theory study on women and shame", Families in Society: The J. of Contemporary Social Services, vol. 87, no. 1, pp. 43-52, Jan. 2006.

[2] T. J. Ferguson, H.L. Eyre, and M. Ashbaker, "Unwanted identities: A key variable in shame–anger links and gender differences in shame", Sex Roles, vol. 42, no. 3-4, pp, 133-157, Feb. 2000.

[3] P. Gilbert, "Evolution, social roles, and the differences in shame and guilt", Social Research: An International Quarterly, vol. 70, no. 4, pp. 1205-1230, 2003.

[4] H.B. Lewis, *Shame and guilt in neurosis.* New York: International Universities Press, 1971.

[5] M. Lewis*, Shame: The exposed self*. New York: The Free Press, 2006.

[6] J.P. Tangney, and R.L. Dearing, *Shame and guilt*. New York: Guilford Press, 2002.

[7] K.J.Van Vliet, "Shame and resilience in adulthood: A grounded theory study", Journal of Counseling Psychology, vol. 55, no. 2, pp. 233-245, Apr. 2008.

[8] T.J. Scheff "Shame in self and society", Symbolic interaction, vol. 26, no. 2, pp. 239-262, 2003

[9] J.L. Huff, B. Okai, K. Shanachilubwa, N.W. Sochacka, and J. Walther, "Unpacking professional shame: Patterns of White, male engineering students living in and out of threats to their identities" Journal of Engineering Education, vol. 110, no. 2, pp. 414-436, Mar. 2021.

[10] K.C. McLean, and M. Syed, "Personal, master, and alternative narratives: An integrativeframework for understanding identity development in context", Human Development, vol. 58, no. 6, pp. 318-349, 2015

[11] A. Vaccaro, and B.M. Newman, B. M., "Development of a sense of belonging for privileged and minoritized students: An emergent model" Journal of College Student Development, vol. 57, no. 8, pp. 925-942, 2016.

[12] J.L. Huff, J. Walther, N.W. Sochacka, M.B, Sharbine, and H. Kamanda, "Coupling methodological commitments to make sense of socio-psychological experience", Studies in Engineering Education, vol. 1, no. 2, Dec. 2020.

[13] H. Kamanda, J. Walther, D. Wilson, M.A. Brewer, N.W. Sochacka, "The role of expectations in the educational experience and professional socialization of engineering students" Journal of Higher Education Theory and Practice, vol. 20, no. 15, 2020.

[14] S. Secules, N.W. Sochacka, J.L. Huff, and J. Walther, J., "The social construction of professional shame for undergraduate engineering students". Unpublished manuscript.

[15] M. Brewer, N.W. Sochacka, and J. Walther, "Into the Pipeline: A freshman student's experiences of stories 'told' about engineering. *Paper presented at the American Society for Engineering Education Annual Conference &amp; Exposition, Seattle, WA, June 2015*

[16] J.A. Smith, P. Flowers, and M. Larkin, M, *Interpretative phenomenological analysis: Theory, method, and research.* London: Sage Publications, Ltd., 2009.