

Coloring Our Pathways: A Collaborative Inquiry of Graduate Students' Journeys into Engineering Education

Michaela Harper, Utah State University

Michaela Harper is a doctoral student at Utah State University, pursuing a Ph.D. in Engineering Education. She holds a Bachelor's degree in Environmental Studies, focusing on STEM and non-traditional education approaches, and a Master's degree in Engineering Education, where she explored faculty perspectives on Generative Artificial Intelligence (GAI). Michaela's current research delves deeply into the effects of disruptive technologies on engineering education, driven by her passion for uncovering the foundational nature of phenomena and applying an exploratory and explanatory approach to her studies. Her work aims to illuminate how technological advancements reshape educational landscapes through student and faculty engagement.

Kristine Marie Peterson, Utah State University - Engineering Education

Kristine Peterson is a Graduate Student in the Engineering Education Department at Utah State University. She holds a B.S. in Biological Engineering from the same institution, where she developed a strong interest in inclusive teaching practices and STEM outreach. Her research focuses on accessibility and the inclusion of individuals with disabilities in engineering, informed by her personal experiences with chronic illness. She has eight years of research experience in biomaterials and pharmaceuticals, with publications in peer-reviewed journals and presentations at national conferences. Peterson has also served in multiple teaching assistant roles and is committed to engaging students through creative methods such as visual tools, humor, and analogies. She is an active member of the Society of Women Engineers and a recipient of several academic awards.

Mr. Daniel Kane, Utah State University

Daniel Kane is a third-year Ph.D. student in the department of engineering education at Utah State University. His research interests include spatial ability, accessibility for students with disabilities, artificial intelligence in education, and enhancing electric vehicle charging system infrastructure. Daniel has contributed significantly to the development of the Tactile Mental Cutting Test (TMCT) which is a significant advancement in assessing spatial ability for blind and low-vision populations. His research has helped inform teaching methods and develop strategies for improving STEM education accessibility. Currently, he is studying how AI tools are utilized by students across USU's colleges to optimize their educational value. Daniel has also served as president of the ASEE student chapter at USU where he initiated outreach activities at local K-12 schools and promoted student engagement in research.

Vanessa Tran, Utah State University

Bachelor's Degree: Civil Engineering, the University of Architecture, Vietnam. Master's Degree: Global Production Engineering and Management, Vietnamese - German University, Vietnam. Ph.D. Student in Engineering Education, College of Engineering, Utah State University.

Autumn Cuellar, Utah State University

Autumn Cuellar is a Ph.D. student in Engineering Education. Her undergraduate and master's careers were both in Computer Science. She believes that everyone can achieve their goals, regardless of physical ability. This is why Autumn strives to make engineering accessible for everyone.

Thi Kim Uyen Nguyen, Utah State University

Uyen Nguyen is a Ph.D. student in Engineering Education at Utah State University. She earned a master's degree in Mechanical Engineering Technology from Ho Chi Minh City University of Technology and Education. Her research interests include exploring innovative teaching methods and addressing challenges to improve the overall quality of education toward sustainable education.

Dr. Zain ul Abideen, Utah State University

Zain ul Abideen holds a Ph.D. in Engineering Education from Utah State University, where he also served as a Graduate Researcher. He is a computer engineer and earned his bachelor's degree in computer engineering and master's degree in engineering, and brings over a decade of experience in teaching and research with undergraduate engineering students. He actively contributes to several technical committees and serves as a reviewer for leading journals and international conferences. His doctoral research focused on cognitive engagement, AI in education and engineering design, self-regulated learning, and mobile learning. His work seeks to deepen our understanding of how these elements influence learning and success in engineering education. With a strong commitment to educational advancement and a robust academic background, Zain is recognized as a dedicated and emerging scholar in the field of engineering education.

Linda Ahlstrom, Utah State University

Linda Ahlstrom PhD student currently studying Engineering Education at Utah State University. Interested in the University to Industry interface and the use of AI tools in engineering. MS Electrical Engineering Cal State Long Beach. Worked in industry: Biomedical, Software Development and Aerospace.

Sujata Basnet, Utah State University

Sujata Basnet is a PhD student in Department of Engineering education at Utah State University. She received her master degree in Water Engineering from Asian Institute of Technology(AIT),Thailand. Her research interest lie in exploring spatial ability development and assessment, particularly through tools like the Tactile Mental Cutting Test (TMCT), and understanding its intersections with gender, socio-economic status, and underrepresented groups such as Native American children in STEM education.

James Blake, Utah State University

James Blake received a B.S. in Mechanical Engineering from Utah State University. He is currently pursuing a M.S. in Mechanical Engineering and a Ph.D. in Engineering Education from Utah State University.

Leslie Anna Brown, Utah State University

Leslie Brown is an Engineering Education Master's student at Utah State University. Her thesis focuses on training high school STEM teachers to implement engineering curriculum into their classrooms.

Ms. Le Tram Huong Dang, Utah State University - Engineering Education

Ms. Le Tram Huong Dang is a Graduate Student in the Engineering Education Department at Utah State University (USU). Her research focuses on how institutional structures and policies shape the experiences of students with disabilities in STEM. As a lecturer in civil engineering in Vietnam, she has experience in teaching, educational technology, and civil engineering education. She has conducted studies on teaching methods and course design in civil engineering education. She holds B.S. and M.S. degrees in mapping, remote sensing, and geographic information systems (GIS).

Emily Fitzpatrick, Utah State University

Emily Fitzpatrick is a graduate student at Utah State University, pursuing an M.S. in Mechanical Engineering and a Ph.D. in Engineering Education. She is a National Science Foundation Graduate Research Fellow and a USU Presidential Doctoral Research Fellow. She received a B.S. in Mechanical Engineering from the University of Nebraska–Lincoln.

Mr. Abdul Wasay Khan Laghari, Utah State University

Abdul Wasay Khan Laghari is a graduate researcher in the Department of Engineering Education at Utah State University. Abdul's research endeavors are primarily dedicated to the critical analysis of engineering competencies, the formulation of engineering education policy, and the advancement of accreditation standards.

Dr. Talha Naqash, Dickinson State University

Dr. Talha Naqash completed his doctoral studies in Engineering Education at Utah State University. With a diverse academic foundation, he also holds a Master's degree in Telecommunication and Networking. He is currently serving as a faculty member at Dickinson State University in the School of Applied Sciences. Dr. Naqash's research focuses on cognitive engagement analysis, assessment methods in engineering education, and the role of facial expressions and emotions in the learning process. His scholarly contributions include numerous publications and presentations at prestigious venues such as IEEE, ASEE conferences, and leading Wiley and Springer journals. He is an active member of several technical committees and serves as a reviewer for reputable journals and international conferences, including the ASEE and IEEE Transactions on Education. Dr. Naqash's dedication to advancing educational research, combined with his broad academic and professional experience, underscores his commitment to fostering innovation and excellence in engineering education.

Gabriel Van Dyke, Utah State University

Gabriel Van Dyke is a Graduate Student and Research Assistant in the Engineering Education Department at Utah State University. His current research interests are engineering culture and applying cognitive load theory in the engineering classroom. He is currently working on an NSF project attempting to improve dissemination of student narratives using innovative audio approaches. Gabe has a bachelor's degree in Mechanical Engineering from Utah State University (USU).

Foeday Zinnah, Utah State University

Foeday Zinnah is a graduate researcher and a second-year Ph.D. student in the Department of Engineering Education at Utah State University. He holds a master's degree in soil and water sciences from the Hebrew University of Jerusalem and a bachelor's degree in civil engineering from the University of Liberia. His research interests focus on engineering workforce development, particularly the role of non-degree credentials and work-based learning in shaping STEM career pathways. He is also interested in e-learning management and the use of diverse learning methods to enhance learning outcomes for both traditional and non-traditional learners. Additionally, Foeday brings professional experience in youth and community development, nonprofit leadership, and online learning management in higher education.

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Abstract

Graduate students often enter engineering education (EED) from varied backgrounds and with diverse motivations, but little research has explored how personality and identity shape these pathways. While prior work has examined graduate student identity development in engineering and education broadly, few studies capture how cohorts themselves reflect on and make meaning of their entry into EED. Understanding these perspectives is essential for both supporting graduate student development and strengthening the field's inclusivity.

This paper presents a collaborative inquiry (CI) conducted by 17 EED graduate students. We engaged in a reflective process using the Color Code Personality Assessment, developed by Dr. Hartman, as a lens to explore how our individual traits influence our academic choices, career trajectories, research interests, and collaborative experiences. Unlike traditional research approaches, in which participants are solely subjects of analysis, CI positions all members as both participants and co-authors, ensuring that each voice contributes equally to meaning-making and dissemination.

Data collection followed a structured reflection protocol. First, each participant completed the personality assessment and wrote responses to guided prompts, including: 1) *How do you see your personality traits shaping your pathway into engineering education and your goals within the field?* 2) *What aspects of your color results resonated with you, and what aspects surprised you?* 3) *In what ways do colleagues, mentors, or peers perceive your personality, and how does this align with your own self-perception?* 4) *How do you see personality dynamics within our cohort contributing to collaboration, community, and identity development in engineering education?* Participants simultaneously reflected on how personality differences contribute to collaboration and community within the cohort. Reflections were then analyzed asynchronously by each participant and discussed as a whole cohort, culminating in a collective synthesis of emerging themes.

Our analysis highlights how personality traits both support and complicate pathways into EED. For some, characteristics such as adaptability or empathy helped explain persistent interests in teaching, mentoring, or equity-driven research. For others, reflections revealed tensions between self-identified traits and external perceptions, which shaped how they navigated collaboration and belonging within the department. The cohort also identified personality diversity as an asset, noting that differences enhance teamwork, broaden perspectives, and shape identity within the discipline. Rather than positioning personality as a causal factor, participants used these frameworks as a shared language to interpret motivations, navigate interpersonal dynamics, and make sense of identity development and belonging within their graduate cohort.

Authorship Note: All authors participated in reflective writing and collaborative analysis. Author 1 coordinated the study design and, with Author 2, coordinated analysis, synthesis, and manuscript drafting. Authors 3-5 contributed to the study ideation, reflection protocol, analysis, and revision. Author 6 contributed logistics and revision. All remaining authors contributed as described and are listed alphabetically. There was no senior author or faculty advisor on the paper.

Introduction

Graduate students enter Engineering Education (EED) through varied pathways, often transitioning from disciplinary engineering, K–12 and higher education teaching roles, industry, or other professional trajectories. These pathways are not only academic or occupational; they are identity projects shaped by belonging, recognition, and perceived fit within engineering and the social worlds of graduate programs [1], [2], [3], [4]. Over time, doctoral students negotiate who they are becoming. Whether they "fit" the expectations of their program and their broader discipline, a process closely tied to motivation, persistence, and well-being [4], [5], [6]. While EED research has produced robust theory and measurement around engineering identity and belonging, graduate students' own cohort-level meaning-making about their pathways into EED remains less visible in published work, particularly when the cohort is positioned as the interpretive authority rather than as a population to be measured [7], [8].

This paper addresses that gap by presenting a collaborative inquiry (CI) conducted by 17 EED graduate students at a single university. Our intent is not to claim that personality causes entry into EED, nor to treat a personality assessment as a diagnostic or predictive tool. Instead, we use the Color Code Personality Assessment [9] as an accessible, shared language that supports structured reflection on motivation, interaction, and identity formation within a graduate cohort. Prior psychometric work has reported evidence of reliability and construct validity for the Color Code instrument in employment selection contexts [10]. At the same time, scholarship and commentary caution that personality tools can invite overinterpretation and may trade predictive accuracy for interpretive "fit" or user gratification [11], [12]. In educational contexts, such tools can become reductive when treated as fixed categories rather than as prompts for reflexive dialogue. We therefore adopt a deliberately bounded stance: personality results function here as a reflective heuristic, not as a classification of persons, nor as a substitute for established trait models or validated identity measures.

Our study is also motivated by engineering education research that demonstrates how graduate identity and motivation are shaped by perceived fit, disciplinary norms, and relational experiences. Work has shown that engineering doctoral students' perceived identity fit is associated with motivation and performance, and that identity-linked experiences in graduate school matter for how students interpret their role as engineers, researchers, and scientists [2], [3], [4], [5], [11], [13], [14]. Large-scale studies further suggest that graduate engineering identity differs across disciplines and is patterned by race/ethnicity, gender, advising relationships, and time in program, underscoring that doctoral identity development is socially situated rather than purely individual [1], [15]. Related scholarship on belonging highlights departmental climate and relational support as key mechanisms through which students engage, persist, and interpret themselves as legitimate members of a community [16], [17]. These mechanisms are not only relevant for doctoral students from disciplinary engineering; they also matter for EED students navigating interdisciplinary expectations, legitimacy, and professional formation.

Methodologically, we build on CI informed by collaborative autoethnography (CAE), drawing from Secules and colleagues' [8] approach to assembling positionality reflections as a collective analytic object and Walther and colleagues' [18] use of CI as a structured method for practice-based meaning-making in engineering education research. We initially considered using CAE as

our primary methodology; however, we determined it was not feasible with a large author group, given that many CAE traditions emphasize sustained, iterative co-analysis and co-writing among a small number of collaborators. We therefore describe our approach as collaborative inquiry informed by autoethnographic commitments, centering lived experience, reflexivity, and context while using a workflow that is realistic at a cohort scale. This workflow includes individual reflective writing, asynchronous collective theming, small-group verification, and final cohort-level review and validation. Together, this structure maintains democratic knowledge production while acknowledging the practical limits of time, scheduling, and the depth of involvement among 17 graduate students.

Our purpose is to explore how personalities, identified through the Color Code personality assessment [9], intersect with our pathways into engineering education and our professional identities by addressing the research question:

How do engineering education graduate students collectively use personality-based reflection to make sense of their pathways into the field and their experiences of identity, collaboration, and belonging within a graduate cohort?

By foregrounding graduate student voices through collaborative inquiry, this paper contributes to three main benefits for EED:

1. a cohort-grounded account of EED pathway sensemaking
2. a replicable reflection-plus-analysis protocol for graduate communities
3. a transparent methodological adaptation that addresses the scale challenges of collaborative authorship while preserving analytic credibility [18], [19].

Hartman Color Code Personality Test

The Color Code Personality Assessment is a self-report instrument developed by Hartman [9], that identifies four primary personality types represented by colors: Red, Blue, White, and Yellow. Participants complete a short questionnaire that assesses preferences and tendencies in interpersonal and decision-making contexts, yielding a dominant color that reflects their primary motivational orientation.

Each color represents a distinct motivational pattern. Red personalities are typically driven by power, leadership, and results-oriented action. Blue personalities prioritize meaning, authenticity, and strong interpersonal connections. White personalities tend to value peace, flexibility, and mediation within group dynamics. Yellow personalities are associated with enthusiasm, creativity, and social engagement. Because the model focuses on motivations rather than fixed behaviors, individuals may demonstrate characteristics of multiple colors while still exhibiting a dominant color or personality [9]. Within this study, the Color Code personality test provided shared language that supports structured reflection on motivation, interaction, and identity formation within our graduate cohort.

Ideation and Design

This study was the result of a long-time desire in the department. Collectively, we discussed and teased about our differing journeys into EED for several years before Kane found the Color Code Personality Test [9] and encouraged everyone to take it. After the cohort had largely completed

the personality test and we were comparing our results, we realized there were similarities (see Figure 1): most students in our cohort had low Red scores, except Harper, who had the highest Red score. When chatting between projects, it seemed like the results highlighted aspects of everyone's pathways into EED. Harper jokingly suggested that combining the personality results and our individual reflections would make an interesting paper for the Student Division at ASEE. After a few weeks of back-and-forth and the idea spreading within the department, Kane, Tran, and Cuellar convinced Harper to lead the paper. Before formal recruitment, nearly the entire graduate student body in the department had casually taken the personality test, so Harper emailed the EED graduate student list to ensure every student had the opportunity to participate in this CI [18], [20], [21], [22]. In total, 17 graduate students from the department agreed to participate.

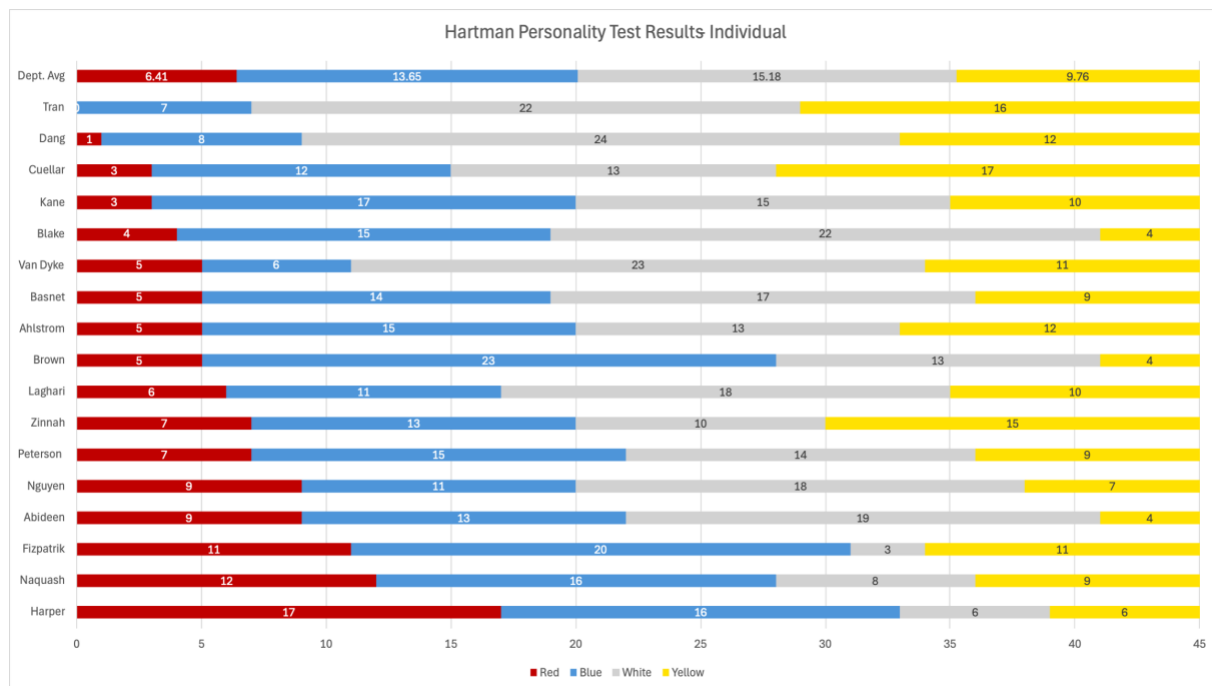


Figure 1: Hartman [9] Color Code Personality Test Results by Individual

Methods

Each graduate student is both a participant (sharing their personality results and reflections) and a researcher (co-analyzing and co-authoring). With this emphasis on self-reflection linked to a shared academic context, the original intent was a collaborative autoethnography (CAE), as that allows us to treat each student's reflection as valid data, use the group setting to analyze patterns across reflections, and authentically publish with all participants as co-authors, since everyone is both a data source and analyst [23], [24]. However, the depth of reflection required for CAE was infeasible with 17 participant collaborators; instead, collaborative inquiry offers a similar opportunity for group reflection on topic-specific knowledge generation, while allowing greater flexibility in depth and participation [8], [18]. Ultimately, the cohort agreed that CI informed by CAE was the best approach for this study.

Data Collection

Guided by Secules and colleagues' [8] collaborative inquiry, Harper, Kane, Tran, and Cuellar developed four reflection questions together. The reflection protocol began with a reminder of the shared study purpose, followed by instructions to ground the reflections in shared meaning and direction. The four reflection questions were designed to illuminate and refine thoughts captured from the casual discussions before the study, and participants were asked to aim for at least one paragraph per question, but to write as much or as little as felt meaningful:

1. How do you see your personality traits shaping your pathway into engineering education and your goals within the field?
2. What aspects of your color results resonated with you, and what aspects surprised you?
3. In what ways do colleagues, mentors, or peers perceive your personality, and how does this align with your own self-perception?
4. How do you see personality dynamics within our cohort contributing to collaboration, community, and identity development in engineering education?

Each participating graduate student responded to the questions in a separate Word document and saved their completed reflection in a shared Box folder for the study.

Data Analysis

Originally, we planned to analyze in three steps: 1) small groups of 3-4 people reading their responses, then developing preliminary insights as codes or categories, 2) group discussion as a full cohort to share the initial insights, and 3) collective synthesis of codes, categories, or themes from the small and large group discussions. Unfortunately, our cohort was unable to arrange schedules to allow for synchronous discussion. Instead, Nguyen developed a Lucidspark Board (see Figure 2), where ideas were shared asynchronously in stages:

1. Participants read and reviewed all reflections in the shared Box folder, developing initial categories from the reflections, and shared those categories as individual stickies on the Lucidspark Board
2. Individually, and asynchronously, participants moved stickies into frames based on similar ideas, implications, and connotations, resulting in several initial themes
3. In several small groups, participants discussed, corrected, and verified the themes based on another review of both the themes and the reflection questions

Because all participants were also authors, we did not blind the analysis. Instead, we analyzed reflections collaboratively with known respondents to allow clarification and iterative interpretation throughout the analytic process. After the collective analysis and theming, Peterson checked the notes, reflections, and themes for a final round of verification. Peterson also organized and visualized the data for presentation.

Analysis Results

In CI and CAE, it is common to include all participants' reflections in the results; however, due to the paper's length and our cohort size, we could not include all reflections in context, so we selected quotes to represent each intersection (see Appendix A: Full Reflection Responses in Author Order for the full reflection). While the patterns fit under each question, we selected quotes from all reflection questions, not just the one that inspired the intersection. We did this because all reflection questions are related, and the themes were extracted from all the reflections as a whole unit.

The first intersection identified was how personality traits shape students' goals and plans as they approach engineering education. The participants in the study come from a variety of backgrounds; some started straight out of their undergraduate education, others spent years in the engineering industry, while some have been teaching engineering already before approaching this degree. However, a pattern in our analysis is that the overall purpose of EED was directly

aligned with their personality, directly impacting their goals and future plans. This pattern is well represented in quotes from Fitzpatrick and Tran.

Fitzpatrick: During college, I realized that while I appreciated parts of the engineering curriculum, I did not feel drawn to industry work. What I felt consistently drawn to was teaching.

What stands out to me already is that many of us were drawn to engineering education not just for the technical dimension of engineering, but because we value people, learning, and making the field more inclusive and supportive.

Tran: After working in industry as an engineer for more than ten years, I started feeling less motivated. I think this shift reflects a blend of my White and Yellow motives: the White side that seeks peace, acceptance, and routine can also get easily bored, while the Yellow part craves variety and adventure. This might explain why I moved from civil engineering for my bachelor's, to industrial engineering for my master's, and now to a PhD in engineering education. I want to experience the engineering field from multiple angles.

These responses show that, while paths differ, the motivation for engineering education is to better align with the individual's personality. This naturally connects to a focus on creating positive change within engineering education, and how they see their identity as someone who focuses on helping others, as represented in this quote from Peterson.

Peterson: I think that a lot of those in our department or community in the EED department at [blinded for review] are similar to one another. As I think about what I know about why many of us are in engineering education I think it has to do with wanting to change things for the better.

These themes, personality alignment with EED, and desires to create positive changes, were how participants framed their goals and plans. While many different paths were taken to arrive at EED, the motivation seen in both individuals and peers, despite differences in personality, was to create change and improve engineering education.

Intersection 2: Resonance, Surprise, and Internal Tension

While the data shows that many participants have similar dominant personalities, with significant representation of both White and Blue personalities, the themes of the second intersection show that each participant made sense of their individual combination of these personalities. While participants' reactions shared commonalities, they were not surprised to find that they aligned with their highest-scoring core personalities. The responses to their combination were where things varied. This pattern is captured in Basnet's reflection.

Basnet: My results resonated with me because they reflect how I naturally approach engineering education: I value calm, stability, and fairness (White), and I place a strong emphasis on meaningful relationships, empathy, and supporting others (Blue). These traits connect closely to my past experiences, because I learned best when instructors and peers provided patient guidance, clear expectations, and a sense of trust especially during difficult engineering coursework. I was not surprised by my lower Red (power) score, since I have never been strongly motivated by competition, control, or being the most

dominant voice instead, I tend to lead through collaboration and consistency. What surprised me more was seeing how clearly White and Blue stood out, because it helped me recognize that my strongest strengths in engineering education are creating a low-stress environment and building genuine connections that help students persist and succeed

In Basnet's reflection, she notes that certain traits in her results were not a surprise; the combination, while surprising, helped her make sense of aspects of her personality. In addition to this kind of response, some students found that the contradictions in their personality combinations were surprising but a bit harder to understand. This is seen in Cuellar and Harper's responses to their personality combinations. Cuellar, a strong Yellow who values having fun with peers, found that her second-highest White was difficult to understand, as Whites are often noted to value independence and solitude. Harper scored the highest in Red, followed by Blue, which was almost tied. While trying to make sense of this, she used ChatGPT to summarize how the interaction might play out. Her response to the difficulties that can come from that specifically resonated with her.

Harper: It was both a punch in the gut and validation at the same time, and I think the tension between the Red/Blue has been a major aspect of my frustration and enjoyment of EED. I really want to help. I want to do something meaningful, but I don't feel capable or qualified. Perhaps the best way to summarize my life would be in the response Chat gave to my "oof..." message: "That means you often feel like you're carrying both the vision and the weight of responsibility for how it affects everyone involved." My choices, my actions, my goals always impact others, and I feel like it is my responsibility to see both the ideal and the reality of how to get there.

This contradiction was closely linked to the first intersection, where students could see how their personalities and experiences led them to EED. It is noted that the aligning and conflicting parts of their personality and identity influenced their motivations. Both Brown and Laghari note this connection between identity and motivation.

Brown: I also have noticed my work ethic either declines, or becomes higher quality so long as I am creating something valuable or living to my values. That is a huge part of this personality trait and my work ethic when it comes to engineering projects, or research papers.

Laghari: If I relate my personality score to my research, it is clear why I chose to focus on sustainability competencies. I have empathy for future generations and want them to live in a better world than we do today. I believe my work can have a positive impact on society across different regions of the globe.

Intersection 3: Perception and Interaction

The third intersection begins to shift from participants seeing personality as individuals to how they view and understand that perception. Already noted that while students typically have one or two dominant traits, the way they are combined can create unique experiences for each individual. Building on this is a subtle, yet powerful, theme noted in the reflections: the dominant personalities we see in our peers might not be how they see themselves, and this view changes situationally. Kane explained this experience well when he stated:

Kane: Many of my peers in the department likely perceive my personality similar to the results of the assessment. However, because many of the traits associated with blue and white personalities are more individual and less apparent, others may not see those as much. From the perspective of others in the department, I likely appear to have a blue personality when engaged in research or other work-related tasks. However, in social settings I likely appear to align more with a yellow personality.

Blake and Peterson had different, yet parallel thoughts about how this sort of personality situational dependence can present itself.

Blake: My peers may not notice my desire to make connections as much because of how quiet and task oriented, I am in most of the situations I find myself with them.

Peterson: I would guess that some might think of me as a more "fun" personality, but this is more of what I choose to be in the dynamic of my classes. As I have developed in my education I have changed from being the quite kid in the corner of the room, to being someone who is likely to speak up. I would also say that I have had a unique situation as a graduate student, being in a situation where I had some medical conditions and my disability that I often find myself joking about when I am at school to lighten the mood on something that would otherwise be heavy.

Kane, Blake, and Peterson note that elements of their personalities can become more dominant in certain situations, which vary in nature. Kane highlights how understanding of personality can also vary because the nature of certain personality types is less apparent. Building on this theme is the understanding that the situation can be changed, as Tran noted.

Tran: My mentors and peers have created an environment where I feel comfortable and encouraged to participate. Because of that, I now share my ideas more openly, and feel more confident expressing myself. The personality results helped me understand that this change did not happen randomly, it happened because I finally found a space where I feel accepted and supported.

A recurring theme in the reflections is that the situation, or environment created by the people you interact with, can shift the way you present yourself. Feeling safe, supported and understood among a group creates opportunity for different elements of an individual's personality to shine though.

Intersection 4: Collaboration and Community

The final intersection focused on how personality dynamics contribute to our understanding of the EED cohort as a community and in collaboration. The overwhelming response was that collaboration benefits individual differences in personality. As mentioned in the first dimension, this relates to a common focus on helping others, but with a new focus on respecting differences, in ways that complement and support each other's personalities. The benefit of different personalities is well represented in this quote by Dang.

Dang: One thing I really appreciate about our cohort is that people are welcoming of difference and genuinely open with me. My English is not strong, but my peers and faculty are patient, and they actively invite me into the conversation, so I have space to express my thoughts. That makes me feel included. For me, that is also part of

collaboration and community: it's not only about the people who talk the most, but also about the people who create space for others to be heard.

Within the main theme of the benefits of collaboration, a sub-theme was noted, diversity of personality, already briefly mentioned in Dang's quote as "welcoming of difference." In addition to the diversity of background among the students, diversity and variety of personalities in the cohort helped create success. It was noted that understanding and learning to blend personalities' strengths created an inclusive and supportive community. In these quotes from Tran and Fitzpatrick, it was specifically noted how understanding and utilizing strengths can work in teams.

Tran: Understanding someone's personality is a key part of building strong relationships, and this test provides a helpful shortcut. Instead of explaining every detail of a personality, we only need to know their main color or color ratio. This is especially useful when working in teams. For example, a "Red" person can take the lead, a "Yellow" person can keep the energy up, a "Blue" person can help connect everyone emotionally, and a "White" person can keep the team steady and aligned.

Fitzpatrick: When we work together, those traits can balance each other: the people who organize and drive progress can help move ideas forward, while those who focus on relationship-building or big-picture thinking can help ensure that our work stays meaningful and grounded.

Harper noted the specific ways that this collaborative community allows for the community to celebrate each other, especially with our differences:

Harper: I really loved that the department was so supportive of everyone. I actually really like how much everyone wants everyone else to succeed. I've been in too many situations where one person's success is treated as a failure for everyone else—like the crab in the bucket story: no crabs will escape a bucket because the other crabs are always pulling each other down. Our department has been a place where I have felt lifted up, even though I am the "black sheep" without an engineering degree.

Interpreting the Four Intersections

Intersection 1: Goals and Plans reflected a cohort-level throughline as many participants described entering EED because they were drawn toward teaching, mentoring, equity-driven change, or human-centered impact. This resonates with prior scholarship that connects role identity, future-time perspective, and motivation to decisions about educational trajectories and sustained engagement [14]. In our cohort, "fit" was often narrated as alignment between personal motives and the perceived moral and relational purposes of EED, even when participants' prior training emphasized technical competence or industry norms.

Intersection 2: Resonance, Surprise, and Internal Tension highlighted how students used personality results to make sense of complexity rather than to simplify it. Some reflections validated long-held self-understandings; others surfaced contradictions that participants linked to frustration, imposter feelings, or competing demands in memorable ways. This finding is methodologically useful: even when typological assessments are psychometrically limited for predictive purposes, they can still serve as prompts that elicit rich interpretive data on identity negotiation [11], [25]. However, this is also where critique matters. Personality typologies can

encourage reification (treating categories as fixed truths), and popular assessments may prioritize user satisfaction over predictive accuracy [11], [12]. Our approach mitigates this risk by foregrounding participants' interpretations in the Color Code [9] as a conversational scaffold rather than a measurement claim and treating them as the analytic focus.

Intersection 3: Perception and Interaction underscored the situational nature of identity performance. Several participants described how colleagues' perceptions differed from their internal self-perceptions, and how different settings (research work, social interaction, teaching) elicited different "visible" traits. This aligns with research showing that belonging and recognition are context-dependent and that departmental climates shape whether students feel safe to contribute, take risks, and be seen as legitimate members of a community [16], [17]. In this sense, personality talk became a proxy language for discussing relational dynamics, psychological safety, and the subtle norms of graduate education.

Intersection 4: Collaboration and Community framed personality diversity as an asset. Participants described how differences supported team functioning, created space for quieter members, and reinforced a collective norm of lifting one another. This aligns with engineering education work emphasizing the role of community and shared repertoire in professional formation [7], [26]. Participants did not portray the community as automatic: several reflections implied that supportive culture was actively produced through inclusive interaction practices, mentoring norms, and an environment where people felt accepted.

Discussion and Conclusions

This study used collaborative inquiry to examine how an EED graduate cohort made meaning of its pathways and professional identities using a color-coded personality framework as a shared reflective language. Across reflections and the asynchronous synthesis process, our cohort consistently resisted a causal interpretation of personality. Instead, we used personality constructs to name motivations, interpret tensions between values and expectations, and describe how departmental environments shaped whether certain aspects of self became visible in collaboration. This pattern aligns with identity-focused work in engineering education, showing that graduate students' motivation and persistence are shaped by perceived fit, recognition, and relational experiences rather than by individual traits alone [1], [3], [5], [15].

Methodological Reflections and 17 Authors

A likely skepticism is whether cohort-scale collaborative work can maintain rigor while keeping authorship meaningful. We addressed this by structuring participation around CI rather than making claims to full-depth CAE. Our process is consistent with published CI approaches in engineering education that leverage collective reflection and practice-based analysis, including CI informed by autoethnography [8], [18]. We also recognize that autoethnographic and autobiographical approaches raise ethical complexities, including relational exposure, consent in evolving group dynamics, and the challenge of writing about a shared community without inadvertently identifying others [19]. Our study design (opt-in participation, bounded prompts, asynchronous review, and cohort-level verification) is intended to reduce these risks while preserving the benefits of collaborative knowledge production.

Limitations

Several limitations should be interpreted as boundary conditions rather than flaws. First, our cohort is a single departmental context, and the findings should not be generalized to represent all EED graduate experiences [27]. Second, participation was voluntary, and those drawn to reflection and community building may be overrepresented [28]. Third, the Color Code [9] instrument itself may shape what participants noticed or narrated. While evidence exists regarding the instrument's reliability and construct validity [10], typological personality tools remain less established in educational research than trait-based inventories and should not be interpreted as determinative of identity or behavior [11], [25]. Finally, because our analysis was asynchronous, we may have lost some of the generative tension that emerges through real-time dialogue; however, small-group verification and final review supported interpretive credibility, reflecting a common methodological tradeoff in collaborative qualitative inquiry conducted at scale [18].

Implications and Conclusion

Despite these limitations, this paper offers a concrete, replicable model for graduate cohorts seeking shared meanings about identity, belonging, and pathway formation. For programs, the implication is practical: structured reflection protocols can strengthen community and make hidden expectations more discussable, particularly for students navigating interdisciplinary identities or nontraditional entry routes. For EED researchers, this study demonstrates how CI can function as both a research methodology and a professional development intervention, supporting reflexivity while producing analyzable data [8], [18], [27]. This work also supports a careful middle ground in the personality debate: personality frameworks can be useful in education when they are treated as prompts for sensemaking rather than as labels, and when the analysis centers on lived experience and contextual interpretation rather than prediction [11].

Regardless, our CI suggests that pathways into EED are shaped not only by prior training and opportunity structures but also by how graduate students interpret the alignment among their motives, relationships, and the values they want their work to serve. When cohorts are given tools and structures for reflection, they can generate actionable insights into identity development and community practices that support belonging and persistence in engineering education.

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Appendix A: Full Reflection Responses in Author Order

Collaborative Autoethnography Reflection Protocol – Michaela Harper

Purpose: To explore how our personalities (as identified through the color test) intersect with our pathways into engineering education and our professional identities.

Step 2: Individual Reflection

Instructions:

Take about 20-25 minutes to respond in writing to any or all the following prompts. Aim for at least one paragraph per question, but write as much or as little as feels meaningful. Your reflections will serve both as personal data and as contributions to our collaborative analysis.

1. *How do you see your personality traits shaping your pathway into engineering education and your goals within the field?*

One thing I made clear from the start was that I didn't want to "add garbage to the garbage pile"—meaning I didn't want to conduct research just for the sake of doing research. I wanted to make a difference. I didn't initially recognize this aspect of my personality or connect it to the Color Code, but since retaking the Color Code personality profile, I realized how much of my life is motivated by a desire for purpose, a classic blue trait. I have a very unique and roundabout pathway into engineering education, in that I don't actually hold an engineering bachelor's degree. I don't know if that is a reflection of my personality or not, but I eventually made my way into EED, partially out of necessity, and partially because I really want to make changes and help students...I'm not sure I've done that or even have the ability to do so in my current position. It's somewhat disenfranchising. In my ideal world, I would love to clear the pathway into engineering for everyone. I would love to remove so many of the barriers in EED. I just...don't think I'm capable.

I was having trouble really articulating what I meant in this reflection, and I asked Chat to help me sort the strengths and weaknesses of being red/blue through the prompt: "I'm trying to reflect on some of the negative aspects of my personality based on the Hartman color code profile. I am a red/blue, with the red only slightly higher than the blue. What are the common aspects, characteristics, strengths, and weaknesses of each?" Chat gave me a summary of each color separately, followed by a summary of the combination (added as a screenshot below). When I saw the pitfalls, I literally responded to Chat, "oof. that seems spot on...". It was both a punch in the gut and validation at the same time, and I think the tension between the red/blue has been a major aspect of my frustration and enjoyment of EED. I really want to help. I want to do something meaningful, but I don't feel capable or qualified. Perhaps the best way to summarize my life would be in the response Chat gave to my "oof..." message: "That means you often

feel like you're carrying both the *vision* and the *weight of responsibility* for how it affects everyone involved." My choices, my actions, my goals always impact others, and I feel like it is my responsibility to see both the ideal and the reality of how to get there.

 **Red-Blue Combination (Power + Intimacy)**

When Red slightly outweighs Blue:

- You are **principled and driven** — someone who wants to *do things right* and *get things done*.
- You combine **Red's decisiveness** with **Blue's moral conviction**, often leading through integrity and consistency.
- You tend to **set high standards** for yourself and others.
- You may **struggle with delegation** because you want both efficiency and correctness.
- People may see you as both **commanding and deeply caring**, though sometimes the caring is hidden beneath intensity.
- When balanced, you inspire trust because people sense both **competence and conscience**.

Potential Pitfalls

- Inner conflict between your Red "get it done now" and your Blue "do it right and consider everyone."
- Prone to burnout when feeling responsible for outcomes and relationships simultaneously.
- May oscillate between control (Red) and guilt (Blue).
- Might resist vulnerability or rest, fearing it signals weakness or irresponsibility.

2. *What aspects of your color results resonated with you, and what aspects surprised you? How do these connect to your past experiences in engineering or education?*

I have taken the Hartman Color Code test before, and my results are almost always red/blue—often tied or close to tied—so I wasn't surprised by the results. In many ways, I think my compassionate/blue side may have been what kept me from pursuing an undergraduate engineering degree. Especially when I was starting my undergraduate studies, the stereotype that engineers were rude and blunt was common. Since I was often told I was too bossy and blunt as a child, I decided early on that I would prove people wrong: I was going to go into a field where people mattered, not engineering, which was all about numbers. Honestly, I had forgotten that part of myself until writing this reflection. Perhaps that's why I prefer qualitative research, as it allows me to push past the surface or aggregate-level details to understand more nuances in individuals and circumstances.

3. *In what ways do colleagues, mentors, or peers perceive your personality? How do those perceptions align or differ from your assessment results, and how has this influenced your interactions in the department?*

I know at least one person has called me the "department mom", so I would guess I'm seen as bluer and more compassionate, but I also tend to want to get things done and move them off my plate, and that may translate to others seeing me as more productive. I'm not sure. I know that Cass has relied on me by delegating meeting scheduling. I don't mind sending the emails and getting things going, so I guess that could be an indication of her perception of my responsibility and proactivity. I get the feeling that others see me as confident and tenacious, but I often suffer from imposter syndrome.

4. *How do you see personality dynamics within our cohort contributing to collaboration, community, and identity development in engineering education?*

Before this fall, I don't think I would have recognized personality as a major player in the community built in our EED cohort. However, with the transition of students—some graduating and others newly joining—the personalities, community, and cohesion of our department have shifted. One of our graduates has a very bubbly, likely yellow personality, and after she left for her new faculty position, the “party” of the department shifted over to our side of the grad office. It's hard, too, since I feel somewhat isolated from the new cohort. It's not that I don't want to get to know them; I just feel like we live in different orbits, and without the bubbly connecting link, the department feels much more disjointed and almost clique-y. I really loved that the department was so supportive of everyone. While I still stubbornly refuse to respond to the department reply-all email congratulations chains, I actually really like how much everyone wants everyone else to succeed. I've been in too many situations where one person's success is treated as a failure for everyone else—like the crab in the bucket story: no crabs will escape a bucket because the other crabs are always pulling each other down. Our department has been a place where I have felt lifted up, even though I am the “black sheep” without an engineering degree.

Collaborative Autoethnography Reflection Protocol – Kristine Peterson

Purpose: To explore how our personalities (as identified through the color test) intersect with our pathways into engineering education and our professional identities.

Step 2: Individual Reflection

Instructions:

Take about 20-25 minutes to respond in writing to any or all the following prompts. Aim for at least one paragraph per question, but write as much or as little as feels meaningful. Your reflections will serve both as personal data and as contributions to our collaborative analysis.

1. *How do you see your personality traits shaping your pathway into engineering education and your goals within the field?*

With my personality traits from the test I can see that my pathway in engineering was steered towards education because of the high value that I put on connecting with others. While this is possible in engineering industry I feel that I am better suited to teaching because I have the opportunity to work with people when they are possibly vulnerable when they are struggling with engineering topics. I was

2. *What aspects of your color results resonated with you, and what aspects surprised you? How do these connect to your past experiences in engineering or education?*

I think that I was thinking about the stereotypes of an engineer I would think that red would be one of the top personality traits that would show up since it has a focus on logic and practicality something that I often stereotyped into engineering, this was my least. However, I actually agree with this, I resonate with it the least, as far as my motivation is concerned power is the least.

3. *In what ways do colleagues, mentors, or peers perceive your personality? How do those perceptions align or differ from your assessment results, and how has this influenced your interactions in the department?*

I would guess that some might think of me as a more “fun” personality, but this is more of what I choose to be in the dynamic of my classes. As I have developed in my education I have changed from being the quite kid in the corner of the room, to being someone who is likely to speak up. I would also say that I have had a unique situation as a graduate student, being in a situation where I had some medical conditions and my disability that I often find myself joking about when I am at school to lighten the mood on something that would otherwise be heavy. I also tend to joke in many situations that others may not always appreciate. While I do like to keep the mood light, I am pretty dependable, but not always timely or good at responding to my emails or text messages, so I could see my peers or mentors being frustrated with that. But I am very passionate about what I do so if I am going to help or do something I try to do my best.

4. *How do you see personality dynamics within our cohort contributing to collaboration, community, and identity development in engineering education?*

I think that a lot of those in our department or community in the EED department at USU are similar to one another. As I think about what I know about why many of us are in engineering education I think it has to do with wanting to change things for the better. We have a diverse group of people who all come with their own way of doing things, but I think that the main focus we have is on helping others and each other, and I think that this helps create a comradery that is unique yet slightly intimidating to enter. At least for me, I was kind of scared joining in at first, getting to know the others in the group I felt like an outsider at first and it took me a little while to warm up and become part of it.

Collaborative Autoethnography Reflection Protocol – Daniel Kane

Purpose: To explore how our personalities (as identified through the color test) intersect with our pathways into engineering education and our professional identities.

Step 2: Individual Reflection

Instructions:

Take about 20-25 minutes to respond in writing to any or all the following prompts. Aim for at

least one paragraph per question, but write as much or as little as feels meaningful. Your reflections will serve both as personal data and as contributions to our collaborative analysis.

1. *How do you see your personality traits shaping your pathway into engineering education and your goals within the field?*

One of the primary reasons I chose to pursue a degree in engineering education was because I enjoy connecting with students whether through one-on-one tutoring or in a classroom environment. As an undergraduate engineering student, I struggled with a lot of engineering coursework and benefitted from peers and professors who I was able to develop relationships with which then allowed me to learn from them. My highest personality color is blue which is focused on developing relationships and genuine connections with others. I believe that my fundamental need for connection with peers has guided me to a career in engineering education where I hope to treat students in a more humanistic way instead of how many programs have treated students as an “assembly-line product.”

2. *What aspects of your color results resonated with you, and what aspects surprised you? How do these connect to your past experiences in engineering or education?*

My results of the color personality test were mostly in line with my perception of my personality. One thing that made me question the results of my test was the description of red personalities. As I read through the qualities of red personalities, I felt like the grit, determination, and resistance to engaging in unproductive tasks were a good reflection of my attitude towards my work. However, as I reviewed the qualities of other personalities, I realized that there is a significant crossover in work ethic between red, blue, and white personalities. I believe that my work ethic is encapsulated in my dominant blue and white personalities. I can also see a side of myself that resonates with the yellow personality where I take time off from my work to socialize with other people.

3. *In what ways do colleagues, mentors, or peers perceive your personality? How do those perceptions align or differ from your assessment results, and how has this influenced your interactions in the department?*

Many of my peers in the department likely perceive my personality similar to the results of the assessment. However, because many of the traits associated with blue and white personalities are more individual and less apparent, others may not see those as much. From the perspective of others in the department, I likely appear to have a blue personality when engaged in research or other work-related tasks. However, in social settings I likely appear to align more with a yellow personality. In the undergraduate statics course that I teach I try to maintain a classroom culture of rigor, respect, and order while also interweaving fun traits associated with the yellow personality to build rapport with students.

4. *How do you see personality dynamics within our cohort contributing to collaboration, community, and identity development in engineering education?*

Throughout my time as a student in three departments within the college of engineering, I have observed that the engineering education department is by far the most tight knit. I believe that is because of the interpersonal relationships created as a result of many of the students having blue as their dominant personality color. Because of the close interpersonal relationships within the department, collaboration on research and other tasks comes much more naturally than in other departments where relationships are built around work. Furthermore, there is enough variation in personality type throughout the students in the department that different students' strengths can compensate for weaknesses in other students on collaborative projects. Because of the diversity of personality types in the department, coupled with an underlying culture of respect for all students, I believe that the engineering education department has great potential for working together effectively.

Collaborative Autoethnography Reflection Protocol – Vanessa Tran

Purpose: To explore how our personalities (as identified through the color test) intersect with our pathways into engineering education and our professional identities.

Step 2: Individual Reflection

Instructions:

Take about 20-25 minutes to respond in writing to any or all the following prompts. Aim for at least one paragraph per question, but write as much or as little as feels meaningful. Your reflections will serve both as personal data and as contributions to our collaborative analysis.

1. How do you see your personality traits shaping your pathway into engineering education and your goals within the field?

My core motive is White (22/45), with additional influences from Yellow (16/45) and Blue (7/45), and no Red (0/45).

I chose to study engineering even though all my family members advised me not to because they believed it was too difficult for women. I even applied to a civil engineering major without telling my parents. Looking back, that decision reflects the White trait of being quietly but firmly stubborn. Once I choose a path, I commit fully to staying on it. After working in industry as an engineer for more than ten years, I started feeling less motivated. I think this shift reflects a blend of my White and Yellow motives: the White side that seeks peace, acceptance, and routine can also get easily bored, while the Yellow part craves variety and adventure. This might explain why I moved from civil engineering for my bachelor's, to industrial engineering for my master's, and now to a PhD in engineering education. I want to experience the engineering field from multiple angles.

The fact that I had no Red in my results makes me want to develop more leadership skills in the future. Interestingly, I pushed past my shyness and fear of public speaking this year by accepting the role of club leader—something I never would have done before. I hope this helps me grow the leadership skills that don't come naturally to me.

2. *What aspects of your color results resonated with you, and what aspects surprised you? How do these connect to your past experiences in engineering or education?*

Several parts of my color results felt very true to who I am. The statement “feeling good is more important than being good” immediately stood out. It reflects how I have always valued emotional well-being. This also connects directly to my research interests in engineering education. I focus on mindfulness, self-compassion, and helping engineering students develop healthier ways of relating to themselves. The Yellow trait—“embracing each day in the present tense”—fits well with my belief, too. Seeing these ideas in my results helped me understand why I motivate to work on this topic.

Another part that resonated with me was the White personality's silent stubborn. When I look back at my decision to study engineering despite my family's discouragement, I can now see how this trait shaped my actions. Instead of arguing or trying to prove anything, I just simply followed the path.

The part that surprised me was “not revealing feelings”. I had always thought of myself as someone who expresses emotions openly. But when I reflected on my earlier experiences during school, I realized that I often stayed quiet. I usually sat in the corner of the classroom, did not raise my hand, and rarely shared my opinions. Even when I felt strongly about something, I tended to keep my thoughts to myself. This made me see that I reveal my feelings only when I feel safe and supported, which aligns with the White trait more than I expected.

3. *In what ways do colleagues, mentors, or peers perceive your personality? How do those perceptions align or differ from your assessment results, and how has this influenced your interactions in the department?*

I feel accepted and safe with my mentors and peers, who all have different personalities. Everyone respects our differences and appreciates our similarities. What's interesting is that we could almost guess each other's main color, and even when we guessed wrong, reading the actual results helped us understand why.

Thinking about this helped me recognize how much I have grown since entering my current program. My mentors and peers have created an environment where I feel comfortable and encouraged to participate. Because of that, I now share my ideas more openly, and feel more confident expressing myself. The personality results helped me understand that this change did not happen randomly, it happened because I finally found a space where I feel accepted and supported.

4. *How do you see personality dynamics within our cohort contributing to collaboration, community, and identity development in engineering education?*

Understanding someone's personality is a key part of building strong relationships, and this test provides a helpful shortcut. Instead of explaining every detail of a personality, we only need to know their main color or color ratio. This is especially useful when working in teams. For example, a "Red" person can take the lead, a "Yellow" person can keep the energy up, a "Blue" person can help connect everyone emotionally, and a "White" person can keep the team steady and aligned.

I think personality awareness also strengthens our sense of community. When we understand each other better, it becomes easier to build trust and respect. People feel more comfortable being themselves because they know others are trying to understand—not judge—their personality styles.

Collaborative Autoethnography Reflection Protocol – Autumn Cuellar

Purpose: To explore how our personalities (as identified through the color test) intersect with our pathways into engineering education and our professional identities.

Step 2: Individual Reflection

Instructions:

Take about 20-25 minutes to respond in writing to any or all the following prompts. Aim for at least one paragraph per question, but write as much or as little as feels meaningful. Your reflections will serve both as personal data and as contributions to our collaborative analysis.

1. *How do you see your personality traits shaping your pathway into engineering education and your goals within the field?*

I have always known that I wanted to help individuals succeed in their goals. At first, I did not know how to achieve this. I went into Computer Science to understand how computers work and eventually help invent adaptive technology. However, the more I interacted with peers and students, the more I realized that I wanted to help others in an interpersonal way. I want to use my outgoing personality to comfort people's worries and provide them with the individual services they need. These interactions will allow me to provide help while allowing my personality traits to shine.

My career path has had many turns from starting as an aspiring programmer to ending up wanting to do disability advocacy work. However, my goals to support disabled individuals has never changed. The twisting path just shows how much I have grown as a person and how much my traits have presented themselves. Currently my blue and yellow traits are starting to shine through. The appearance of different traits may change as I grow more as a person.

2. *What aspects of your color results resonated with you, and what aspects surprised you? How do these connect to your past experiences in engineering or education?*

I always knew that I love making others feel good. I do this by being a joker and bringing smiles to my friends. This is why I was not surprised to see that my personality was mostly yellow. I think learning is easier when everyone is in a good mood. I have used my spirited personality to lighten the mood during study groups when stress levels were high. A quick giggle break always gives a needed reset to the learning environment.

One thing that surprised me was the high white value in my results. White personalities usually get bothered by other people asking them for help. That is not me! I love being able to help other learn and succeed because it allows me to give back for all the help I receive. I want into engineering education in order to be more helpful. Therefore, that quality of white is definitely not me.

3. *In what ways do colleagues, mentors, or peers perceive your personality? How do those perceptions align or differ from your assessment results, and how has this influenced your interactions in the department?*

My peers' perceptions of me align well with my color test results. They perceive me as a friend they can come to talk to and someone who is willing to help. They also know I will bring up their spirit whenever they come to talk to me. This alignment has created a welcoming environment in the department for me. I can comfortably work and talk to my peers without having to hide my personality. The welcoming department definitely makes me want to come to school every day.

4. *How do you see personality dynamics within our cohort contributing to collaboration, community, and identity development in engineering education?*

I think our cohort has a good blend of personalities that produce a welcoming environment. We all have commonalities within our personalities, so we are well aligned. The cohort can rely on one another to get help and work on projects easily. This alignment ensures that we can focus on how to improve the engineering education field.

Collaborative Autoethnography Reflection Protocol – Uyen Nguyen

Purpose: To explore how our personalities (as identified through the color test) intersect with our pathways into engineering education and our professional identities.

Step 2: Individual Reflection

1. *How do you see your personality traits shaping your pathway into engineering education and your goals within the field?*

I'm an introvert, so I'm most comfortable working alone. Honestly, that's helped me in engineering. I tend to focus on the details, think things through, and stick with problems until I figure them out - traits that just fit with the work. Looking back, I guess it's not a surprise I chose engineering. I thought I wouldn't have to deal with a lot of social stuff or constant group work, which sounded perfect to me. Plus, I did really well in math and engineering classes.

That said, mechanical engineering wasn't my first choice. If I'm being honest, I always loved architecture. I like the mix of technical skills and creativity, and I've always had a talent for painting. But it just wasn't enough to get me into architecture, so I went with engineering.

After graduating, I started teaching engineering. I didn't feel like I could compete in the industry, where you have to be outgoing and quick to speak up. In education, I get to listen more, observe, and really notice what students struggle with. I want to design meaningful learning experiences, not just rely on constant social interaction. My calm, thoughtful approach helps me support students and improve how I teach.

2. *What aspects of your color results resonated with you, and what aspects surprised you? How do these connect to your past experiences in engineering or education?*

The color test results said my main motivation is peace, which fits me perfectly. I like quiet, I think before I act, and I feel best when I have space to focus. I was not surprised to see that I have trouble communicating in groups. It's true. I quite avoided group work or big discussions. But maybe it's mostly because I have to use English. I'm not confident in my English. I work best when I have time to prepare and think things through. Still, I know collaboration matters, so over time I've pushed myself to share more in academic settings.

What surprised me was perhaps a small effect of Blue (11 compared to 18 for white). Yet, I guess it makes sense. I'm not great at building new relationships, but if I get close to someone, I'm loyal and trustworthy. The Blue side also drives me to care deeply about my students' growth and to pursue meaningful teaching.

Sometimes I want to be more outgoing, because I admire positive, energetic people, but it's tough for me. If I force it, I just end up drained. That's why I usually avoid big social events or only join in a little. Sometimes, it leaves me feeling like I'm wrestling with myself inside. Like, if I were more outgoing, maybe I could build more relationships, which would definitely help my career development, especially in my research path. It makes sense, but I simply can't even if I want.

3. *In what ways do colleagues, mentors, or peers perceive your personality? How do those perceptions align or differ from your assessment results, and how has this influenced your interactions in the department?*

When it comes to interacting with supervisors or higher-ups, I'm honestly pretty hesitant. I try to avoid those situations. My colleagues and supervisors see me as quiet, serious, and reliable. They'll say I'm a good listener and that I think things through, but I don't talk much. That matches my own sense of my personality and the assessment results - introverted and reflective.

But sometimes people think I'm cold or distant just because I'm quiet, which isn't true. I just need time to process my thoughts, and I don't always want to share what I'm feeling. Like one comment in a white personality test result says, "they don't reveal their feelings". That's me. Realizing this has pushed me to try to communicate more clearly and show appreciation, which helps build trust in the department.

4. *How do you see personality dynamics within our cohort contributing to collaboration, community, and identity development in engineering education?*

I think having all kinds of personalities in our group provides balance, making things work better. The extroverts bring energy and help everyone connect, while people like me - more on the introverted side - bring reflection and careful analysis. We balance each other out and learn from each other, which makes for a stronger academic community. Sometimes I worry I'm not contributing enough, since I'm not a leader (my survey results show few "red" answers), and I don't give directions or make big decisions. But I do my best and often go beyond what's expected.

Being in a diverse group helps me grow. I get to watch how others express themselves and slowly become more confident sharing my own ideas. Altogether, our differences help us build a real sense of identity and connection.

Collaborative Autoethnography Reflection Protocol – Zain Abideen

Purpose: To explore how our personalities (as identified through the color test) intersect with our pathways into engineering education and our professional identities.

Step 2: Individual Reflection

Instructions:

Take about 20-25 minutes to respond in writing to any or all the following prompts. Aim for at least one paragraph per question, but write as much or as little as feels meaningful. Your reflections will serve both as personal data and as contributions to our collaborative analysis.

1. *How do you see your personality traits shaping your pathway into engineering education and your goals within the field?*

My White and Blue personality traits, calmness, adaptability, and relationship-building have shaped both my entry into engineering education and my goals within it. My

experiences as a Transmission engineer in the Telecom sector and later as an engineering and computer science instructor showed me how differently students learn. Seeing students disengage when teaching methods did not match their learning styles motivated me to pursue a PhD in engineering education. My personality aligns with a student-centered approach where I act as a facilitator, designing research-based teaching and assessment strategies that promote engagement, clarity, and meaningful learning for diverse learners.

2. *What aspects of your color results resonated with you, and what aspects surprised you? How do these connect to your past experiences in engineering or education?*

My White personality traits of kindness, balance, and the desire for agreement strongly resonate with how I approach teaching and interacting with students. The Blue traits of connection and empathy also reflected my desire to build supportive learning environments. I was somewhat surprised at how strongly the blue color appeared, but it makes sense given my emphasis on student relationships, feedback, and inclusive teaching. Collectively, these traits mirror my past experiences in which I relied on patience, listening, and structure in both engineering practice and classroom instruction.

3. *In what ways do colleagues, mentors, or peers perceive your personality? How do those perceptions align or differ from your assessment results, and how has this influenced your interactions in the department?*

My colleagues and peers often describe me as calm, supportive, and easy to work with, qualities that align closely with my White personality profile. They notice that I listen carefully, avoid conflict, and create steady, respectful relations. Some also see my relational blue traits, especially in how I collaborate and check in with others. Sometimes my quiet, reflective nature is perceived as reserved, but it simply reflects my preference for thoughtful communication and structured interactions. These perceptions help me contribute in ways that feel authentic, largely through clarity, consistency, and supportive collaboration.

4. *How do you see personality dynamics within our cohort contributing to collaboration, community, and identity development in engineering education?*

In our engineering education cohort, I believe the variety of personalities creates balance and strengthens collaboration and collective development. Every one of us brings distinctive strengths in how we communicate, process information, and solve problems. My White and Blue traits help me contribute through harmony-building, listening, and thoughtful engagement, while others bring energy, leadership, or creativity. This diversity

allows us to complement each other's strengths, create an inclusive community, and learn from different communication styles. These dynamics also support identity development by showing that there is no single personality type needed to succeed in engineering education everyone contributes uniquely to the collective learning setting.

Collaborative Autoethnography Reflection Protocol – Linda Ahlstrom

Purpose: To explore how our personalities (as identified through the color test) intersect with our pathways into engineering education and our professional identities.

Step 2: Individual Reflection

Instructions:

Take about 20-25 minutes to respond in writing to any or all the following prompts. Aim for at least one paragraph per question, but write as much or as little as feels meaningful. Your reflections will serve both as personal data and as contributions to our collaborative analysis.

1. How do you see your personality traits shaping your pathway into engineering education and your goals within the field?

I think the engineering training I have received over the years has never left me. It seems as though it has become part of my personality. I have had the opportunity to revisit my engineering roots during my graduate study in Engineering Education, and it has been an opportunity to reflect on Engineering and its impact on my personality traits. I do see some traits that impacted my choice to pursue engineering education. I also see the impact of being an engineer on my personality traits. I think I tend to be driven, detailed oriented and accuracy focused due to my engineering training. As far as traits shaping my path to engineering education I think that "grit" is a strong parallel for me and my pathway into engineering education. It is also a trait I want to dig deeper into and study in an engineering education context. Angela Duckworths portrayal of "grit" [29] has been applied to many disciplines including engineering and is an area of interest for me.

2. What aspects of your color results resonated with you, and what aspects surprised you? How do these connect to your past experiences in engineering or education?

It was interesting to see that my results showed I had a strong presence in all areas. I know this surprised my colleagues. They thought white would be really predominant in my results. I was not too surprised to find that my results tended to be evenly distributed through all of the colors. I think this does tie to my past experience in engineering I have learned to be direct and to dig in on the facts when necessary. White can mean being organized and calm which often represents me but, I also developed a tendency to lead as an engineer and to be driven which are more red

characteristics. I do think my past experience in engineering ties directly to my diversified results.

3. *In what ways do colleagues, mentors, or peers perceive your personality? How do those perceptions align or differ from your assessment results, and how has this influenced your interactions in the department?*

I think my colleges, mentors and peers are still getting to know my personality. I did hear colleges guess that my results would lean white as mentioned. This is not surprising I do appear calm and in fact for the most part I am calm. I don't know if I appear organized but I don't feel that I am organized. I think this has in some part influenced my interactions with the department. The fact that they are still getting to know me impacts my interactions in various ways

4. *How do you see personality dynamics within our cohort contributing to collaboration, community, and identity development in engineering education?*

I think that personality dynamics are great in our cohort. The feeling of collaboration is strong I am appreciative of the tight feeling of community. It is helpful in feeling confident and in my development as an engineering education graduate student. I have felt accepted and a part of the community from day one. I appreciate that in so many ways. Autum told me at the beginning that we are a tight knit group and I have recently heard her tell others that are new the same thing. These types of comments start relationships out on a positive note and help to foster a sense of community. I think that all of my colleagues are great ambassadors for what engineering education should be. They are exemplary in putting into practice the concepts they are learning and work to include everyone.

Collaborative Autoethnography Reflection Protocol – Sujata Basnet

Purpose: To explore how our personalities (as identified through the color test) intersect with our pathways into engineering education and our professional identities.

Step 2: Individual Reflection

Instructions:

Take about 20-25 minutes to respond in writing to any or all the following prompts. Aim for at least one paragraph per question, but write as much or as little as feels meaningful. Your reflections will serve both as personal data and as contributions to our collaborative analysis.

1. *How do you see your personality traits shaping your pathway into engineering education and your goals within the field?*

The motivation for pursuing engineering education is because I want to help shape learning environments where students feel supported, respected, and able to succeed without unnecessary pressure. Through my own academic experiences, I learned how much patience, encouragement, and clear guidance from instructors and peers can change the way students engage with difficult engineering coursework, and it reinforced my belief that students thrive best in classrooms built on fairness, accessible help, and trust. My personality results support this direction: with **White** as my highest score, I am naturally steady, patient, and focused on harmony and reducing stress; my strong **Blue** reflects a genuine value for meaningful relationships, empathy, and commitment to others; my **Yellow** suggests I can bring positive energy and engagement that makes technical content feel more approachable; and my lower **Red** shows I am less motivated by competition or control and more likely to lead through collaboration and consistency. These traits guide me toward engineering education because I want to contribute to more human-centered programs that strengthen both student performance and student well-being.

2. *What aspects of your color results resonated with you, and what aspects surprised you? How do these connect to your past experiences in engineering or education?*

My results resonated with me because they reflect how I naturally approach engineering education: I value calm, stability, and fairness (**White**), and I place a strong emphasis on meaningful relationships, empathy, and supporting others (**Blue**). These traits connect closely to my past experiences, because I learned best when instructors and peers provided patient guidance, clear expectations, and a sense of trust especially during difficult engineering coursework. I was not surprised by my lower **Red (power)** score, since I have never been strongly motivated by competition, control, or being the most dominant voice instead, I tend to lead through collaboration and consistency. What surprised me more was seeing how clearly **White** and **Blue** stood out, because it helped me recognize that my strongest strengths in engineering education are creating a low-stress environment and building genuine connections that help students persist and succeed.

3. *In what ways do colleagues, mentors, or peers perceive your personality? How do those perceptions align or differ from your assessment results, and how has this influenced your interactions in the department?*

Colleagues, mentors, and peers often perceive me as calm, dependable, and easy to work with, and someone who listens carefully and treats people with respect. They also tend to see me as supportive and relationship-oriented approachable for questions, willing to help, and committed to doing quality work which aligns closely with my higher **White** and **Blue** results. At the same time, I think others may sometimes interpret my lower **red** tendencies as being quiet or less assertive in group settings, even though I am still engaged and confident I just prefer collaboration and thoughtful discussion over pushing my opinion forcefully. Overall, these perceptions have influenced my interactions in the department by helping me build trust and positive working relationships, and by

positioning me as someone who contributes through consistency, teamwork, and a supportive presence in both research and teaching spaces.

4. *How do you see personality dynamics within our cohort contributing to collaboration, community, and identity development in engineering education?*

I see personality dynamics in our cohort as a major strength because different styles bring different contributions that make collaboration more balanced and effective.

Relationship- and support-oriented people help build trust, inclusion, and a sense of community; detail focused, and thoughtful members strengthen the quality of ideas and research; more energetic and creative personalities keep the group engaged and open to new approaches; and more assertive, action-oriented peers help move decisions forward and advocate for the group when needed. When we recognize and respect these differences, collaboration becomes smoother, conflicts are easier to manage, and people feel they have a legitimate place in the community. Over time, that shared environment supports identity development in engineering education by helping each person see how their unique strengths can contribute to the field and by reinforcing a collective identity centered on improving engineering learning for real people.

Collaborative Autoethnography Reflection Protocol – James Blake

Purpose: To explore how our personalities (as identified through the color test) intersect with our pathways into engineering education and our professional identities.

Step 2: Individual Reflection

Instructions:

Take about 20-25 minutes to respond in writing to any or all the following prompts. Aim for at least one paragraph per question, but write as much or as little as feels meaningful. Your reflections will serve both as personal data and as contributions to our collaborative analysis.

1. *How do you see your personality traits shaping your pathway into engineering education and your goals within the field?*

One of the main motivations for me choosing to go into engineering education was a desire to help along their education paths and to encourage their passions. This fits well with the description of a blue personality as someone who loves to serve and give freely of themselves to nurture other's lives.

2. *What aspects of your color results resonated with you, and what aspects surprised you? How do these connect to your past experiences in engineering or education?*

I wasn't surprised that both white and blue personality types were dominate in my results. I've noticed specifically with the blue personality type of the "need to be understood", as

I often find myself explaining my choices even when the moment does not call for it. I also think this may play a part in a need I have to understand. The need to understand drives me in my education. I also genuinely enjoy and seek connections with others and I think that is why I have enjoyed teaching in various capacities.

3. *In what ways do colleagues, mentors, or peers perceive your personality? How do those perceptions align or differ from your assessment results, and how has this influenced your interactions in the department?*

I think most of my peers would agree with the white personality being my most dominant. Mostly due to white personalities seeking independence and peace. I'm mostly quite and don't overly engage in conversations. My peers may not notice my desire to make connections as much because of how quite and task oriented I am in most of the situations I find myself with them.

4. *How do you see personality dynamics within our cohort contributing to collaboration, community, and identity development in engineering education?*

I find it interesting to be part of a smaller departments where everyone knows everyone to some extent. I came from the undergraduate mechanical engineering program where even in my own graduating class I was not familiar with most names or faces of individuals. These closer connections in the Eng Edu program may be amplified by the high collection of blue personality types, where not just low numbers encourage connection, but also the increase in the desire to making those connections.

Collaborative Autoethnography Reflection Protocol – Leslie Brown

Purpose: To explore how our personalities (as identified through the color test) intersect with our pathways into engineering education and our professional identities.

Step 2: Individual Reflection

Instructions:

Take about 20-25 minutes to respond in writing to any or all the following prompts. Aim for at least one paragraph per question, but write as much or as little as feels meaningful. Your reflections will serve both as personal data and as contributions to our collaborative analysis.

1. *How do you see your personality traits shaping your pathway into engineering education and your goals within the field?*

My personality is blue, which relates to a work-oriented and determined mindset. I see this all the time not just in engineering education, but in every day life. I am quite determined and once I sent my mind to something, I often accomplish that goal. For example, as part of my Master's program I won the GRACO because of a research idea I

had come up with and I was determined to submit a proposal and later a conference paper. While I was in graduate school, my advisor even knew I could be accountable and work independently and diligently to make my goals come to life.

2. *What aspects of your color results resonated with you, and what aspects surprised you? How do these connect to your past experiences in engineering or education?*

I think most of the color results did not surprise me at all. I am very much a blue. I value quality over quantity in almost everything I do. Whether this comes to friends, work projects, or other service projects, I value quality and meaningfulness. However, on the flip side, I do want to be understood and appreciated. I am a highly sensitive person which can be both a strength and a weakness. It helps me to understand where people are coming from, but it can also make my moods switch quite easily. So, in the context of engineering education, I think the blue personality has helped me make personal and meaningful connections with my peers, teachers, advisors, and other potential colleagues through understanding and respect. I also have noticed my work ethic either declines, or becomes higher quality so long as I am creating something valueable or living to my values. That is a huge part of this personality trait and my work ethic when it comes to engineering projects, or research papers.

3. *In what ways do colleagues, mentors, or peers perceive your personality? How do those perceptions align or differ from your assessment results, and how has this influenced your interactions in the department?*

In terms of industry and academia, I think many people see me as a hard worker who can work both independently, and act as a leader. I am devoted to projects I start, and I make deadlines due to this dedication and work-oriented mindset. However, I believe this compassion and work-oriented organizational mindset has made me a strong candidate for leadership positions. You can see that in my impact in the department of engineering education. Within a year of being there I became the club chapter president and became dedicated to shifting the club from inactive standing to active club standing with the college of engineering. I also joined the national ASEE student chapter leadership team due to my dedication and interest in this space both when it comes to the research projects I was given, and the professional connections I was making along the way.

4. *How do you see personality dynamics within our cohort contributing to collaboration, community, and identity development in engineering education?*

Like I said, I think this comes out the most in terms of building strong professional connections with my peers. I saw myself as a student leader within the department, and I believe others saw this as well. I think again, this has to do with the combination of being work-oriented while craving meaningful connections with others, both traits of the blue personality type. I also think a large reason from joining the engineering education department was part of my values. In my past, at previous employers I did not feel valued and I was not making genuine professional connections. It is something that I care deeply

about and I want to strengthen the EED community so that all in the community can make genuine and powerful connections with each other.

Collaborative Autoethnography Reflection Protocol – Hana Dang

Purpose: To explore how our personalities (as identified through the color test) intersect with our pathways into engineering education and our professional identities.

Step 2: Individual Reflection

Instructions:

Take about 20-25 minutes to respond in writing to any or all the following prompts. Aim for at least one paragraph per question, but write as much or as little as feels meaningful. Your reflections will serve both as personal data and as contributions to our collaborative analysis.

1. How do you see your personality traits shaping your pathway into engineering education and your goals within the field?

I identify most with the White profile and those traits strongly shape both my path into engineering education and my goals within it. I'm drawn to teaching because it offers a steady, low-conflict environment where I can focus on my work and minimize unnecessary interactions. I'm less motivated by competition and feel most comfortable where predictability and clear expectations guide the work, which is why teaching appeals to me. I value quiet, respectful interactions; working with students feels comfortable for me because I can listen carefully, give space, and help them progress without pressure.

Since I prefer predictable routines, clear instructions, and thoughtful pacing, so my teaching goals center on improving course organization, creating transparent procedures, and designing resources that make learning straightforward for learners.

2. What aspects of your color results resonated with you, and what aspects surprised you? How do these connect to your past experiences in engineering or education?

What resonated most was the focus on peace, independence, and low-conflict environments. I recognize how much I value steady settings, clear expectations, and time to think before acting. That matches my choices in education: I organize my work so I can move step by step without confrontation or pressure.

What surprised me was the phrase "silently stubborn." It helped me notice a pattern: when I feel rushed, pushed, or given vague directions; I don't argue, I just lose interest and disengage. I prefer to work at my own pace; I don't want to be controlled, and I feel uncomfortable when others demand too much of me. Looking back, this explains why I did well in group projects with clear roles and timelines, but lost energy when meetings turned competitive or when people tried to dominate. The insight isn't negative; it simply shows me where my boundaries are.

3. *In what ways do colleagues, mentors, or peers perceive your personality? How do those perceptions align or differ from your assessment results, and how has this influenced your interactions in the department?*

Colleagues and peers often describe me as quiet, easy to work with, respectful, and someone who doesn't create conflict. This aligns with my White profile. People also tend to assume I'm flexible and agreeable because I don't argue openly, and I think that part is mostly true.

Because of this, in the department I try to manage interactions in a way that feels comfortable for me. I prefer one-on-one conversations, and in large or confrontational discussions I usually stay quiet. I rarely state my opinions directly in the group; most of the time I just keep my reactions to myself. I like having clear expectations, so I often ask for timelines and specific next steps. This helps me stay involved without getting pulled into arguments, and it also lets other people know what I can realistically commit to.

4. *How do you see personality dynamics within our cohort contributing to collaboration, community, and identity development in engineering education?*

One thing I really appreciate about our cohort is that people are welcoming of difference and genuinely open with me. My English is not strong, but my peers and faculty are patient and they actively invite me into the conversation so I have space to express my thoughts. That makes me feel included. For me, that is also part of collaboration and community: it's not only about the people who talk the most, but also about the people who create space for others to be heard.

Within our cohort, I think the mix of personalities is part of what makes the group work. Some people are very direct and comfortable leading the discussion and pushing ideas forward. Others, like me, are calmer and more comfortable listening and creating stability. Both roles matter.

In that way, I think our different personalities support identity development in engineering education. You start to see how you fit into the field not just through your research topic, but through how you show up in the room. Not everyone in engineering education looks, sounds, or communicates the same way, and in our cohort that is accepted instead of treated like a problem. It tells me that I don't have to be the loudest person in the room to belong here. I can contribute through commitment, by staying steady, and by supporting other people. That is also the kind of learning environment I hope to create for my own students.

Collaborative Autoethnography Reflection Protocol – Emily Fitzpatrick

Purpose: To explore how our personalities (as identified through the color test) intersect with our pathways into engineering education and our professional identities.

Step 2: Individual Reflection

Instructions:

Take about 20-25 minutes to respond in writing to any or all the following prompts. Aim for at least one paragraph per question, but write as much or as little as feels meaningful. Your reflections will serve both as personal data and as contributions to our collaborative analysis.

1. **How do you see your personality traits shaping your pathway into engineering education and your goals within the field?**

My pathway into engineering education has been shaped by a combination of curiosity, logic, people-centered thinking, and creativity. I pursued my undergraduate degree in engineering largely because it seemed like a strong practical choice. I grew up in a family of engineers and knew I could succeed in the coursework. Even though I did not feel a deep early passion for engineering itself, I viewed the degree as one with high return on investment and strong career stability.

During college, I realized that while I appreciated parts of the engineering curriculum, I did not feel drawn to industry work. What I felt consistently drawn to was teaching. In fact, had I been asked right after high school what my dream job was, I likely would have said high school math teacher. I chose engineering instead because I believed it would allow me to use my abilities more fully and also keep more doors open. Meeting with one of my first-year professors to ask about academic careers was a pivotal moment. It introduced me to the field of engineering education, which aligned perfectly with my interests. It allowed me to continue developing as an engineer while also centering teaching, mentorship, and understanding student experiences.

My curiosity helped me seek out that conversation and uncover the field earlier than I might have otherwise. Logic guided my initial decision to study engineering. My people-centered orientation helped me recognize that I wanted to work directly with learners rather than focus only on technical problem-solving. Finally, my creativity shows up in the way I think about designing learning environments and imagining how engineering education can evolve.

Together, these traits helped me find a field where I can be both technically grounded and deeply connected to students and their learning. Engineering education allows me to use my strengths while pursuing work that feels both fulfilling and impactful.

2. **What aspects of your color results resonated with you, and what aspects surprised you? How do these connect to your past experiences in engineering or education?**

One aspect of my color results that resonated with me was the emphasis on “seeking opportunities to genuinely connect with others.” This aligns strongly with why I feel at home in engineering education. I have always enjoyed working with people, especially in mentoring or supporting roles. While there are opportunities for connection in industry,

teaching engineering allows for a different kind of interpersonal relationship. I relate well to engineering students and the typical engineer mindset, yet I never saw myself becoming an industry engineer. What makes sense to me is helping others become engineers, supporting them through their learning, and building the kind of relationships that emerge in teaching and mentorship.

Engineering education feels more personal to me than many traditional engineering paths. The community incorporates social science perspectives that make the work feel more human-centered, while still engaging with challenging technical content. This balance of intellectual rigor and meaningful human connection is what makes the field both exciting and fulfilling for me.

Nothing in the results particularly surprised me. Instead, they affirmed what I already know about myself: that I am most energized when I am learning with others, guiding others, and sharing space where connection and curiosity can coexist with technical depth.

3. **In what ways do colleagues, mentors, or peers perceive your personality? How do those perceptions align or differ from your assessment results, and how has this influenced your interactions in the department?**

I am still relatively new to the department, so I do not yet have a strong sense of how others perceive my personality. I hope that colleagues and peers will come to see that I value developing meaningful relationships and that I try to be intentional about how I connect with others. Relationships are very important to me, and I believe that a supportive and collaborative environment strengthens both personal well-being and academic work.

From the people who have worked with me previously, I think the perception would align well with my Blue personality results. They would likely recognize my focus on empathy, connection, and thoughtful communication. At the same time, I believe others would also notice traits that align with the Red category, particularly the idea that “what Reds value, they get done.” I tend to be highly motivated when I care about a project or see its purpose. Much of my academic and professional success has come from following my interests and investing deeply in work that feels meaningful.

These traits shape how I interact in academic environments. I prioritize collaboration, mutual support, and shared purpose, and I am most effective when I am able to work in ways that honor both relationship-building and clear progress toward meaningful goals.

4. **How do you see personality dynamics within our cohort contributing to collaboration, community, and identity development in engineering education?**

I think the personality dynamics within our cohort have the potential to create a strong foundation for collaboration and collective growth. What stands out to me already is that many of us were drawn to engineering education not just for the technical dimension of engineering, but because we value people, learning, and making the field more inclusive and supportive. That shared orientation creates a natural sense of community.

At the same time, we each bring different strengths in how we communicate, process information, and approach problem-solving. Some people may be more structured and task-focused, while others may lean toward reflection, curiosity, or interpersonal connection. I see these differences as an asset rather than a barrier. When we work together, those traits can balance each other: the people who organize and drive progress can help move ideas forward, while those who focus on relationship-building or big-picture thinking can help ensure that our work stays meaningful and grounded.

These dynamics also play an important role in identity development. Being surrounded by others who value teaching, mentorship, and care for students can reinforce a sense of belonging in the field. As we collaborate and learn from one another, we are not only building research skills and disciplinary understanding, but also forming our identities as scholars, educators, and members of a broader community.

Collaborative Autoethnography Reflection Protocol – Abdul Laghari

Purpose: To explore how our personalities (as identified through the color test) intersect with our pathways into engineering education and our professional identities.

Step 2: Individual Reflection

Instructions:

Take about 20-25 minutes to respond in writing to any or all the following prompts. Aim for at least one paragraph per question but write as much or as little as feels meaningful. Your reflections will serve both as personal data and as contributions to our collaborative analysis.

1. ***How do you see your personality traits shaping your pathway into engineering education and your goals within the field?***

My White personality reflects my desire to seek peace in my work, to work independently, and to value kindness. It shapes the way I want to approach engineering education. I aim to work in an environment of independence and harmony while contributing toward my goal of creating a framework for sustainability competencies that promote equity within the field. I prefer to work in teams that encourage collaboration for the benefit of all rather than competition. In my work on sustainability competencies, I believe technical skills are essential, but it is equally important to understand social responsibilities and strive to fulfill them. My Blue and Yellow traits add connection, empathy, and creativity, enabling me to guide students through engaging activities that support transformative learning experiences. I believe this personality traits guide me toward achieving equity, harmony, empathy, and meaningful connections with students in my area of engineering education.

2. ***What aspects of your color results resonated with you, and what aspects surprised you? How do these connect to your past experiences in engineering or education?***

My high score in White personality resonates with me because I value peace, kindness, and independence in my work and in my journey as an engineering education researcher. My blue personality also resonates with me, as I value connections and opportunities to transform the learning experiences of undergraduate engineering students. The Yellow personality partially resonates with me, as I do not see myself as someone motivated primarily by fun in my work. What I found interesting is Hartman's statement that yellow personalities are "uncommitted and unreliable." I do not agree with this, as I believe it is possible to be committed to your work and reliable in producing results while still enjoying the process and finding joy in life and work. A low red score does not surprise me because I am not motivated by power, and power does not drive my decisions or work. I do not believe in competition among peers, although I recognize it as a reality of the world we live in. I think productivity in your work can lead to influence, and through influence, you can create positive changes. If I relate my personality score to my research, it is clear why I chose to focus on sustainability competencies. I have empathy for future generations and want them to live in a better world than we do today. I believe my work can have a positive impact on society across different regions of the globe.

3. *In what ways do colleagues, mentors, or peers perceive your personality? How do those perceptions align or differ from your assessment results, and how has this influenced your interactions in the department?*

I think my colleagues and peers describe me as a person who is peaceful, calm, and approachable, which aligns with my white traits. They would also likely describe me as supportive and someone who tries to build and maintain connections, which reflects my blue traits. However, my colleagues in the engineering education department may not see the fun side of my personality as suggested by the yellow traits, since our work is usually focused more on research than on social settings. Even before pursuing my Ph.D., I was considered a collaborator when working to enhance employees' experiences in my organization. Although I often have ideas, I do not try to assert them strongly with colleagues, which may be reflective of my low red traits. Understanding these dynamics helps me balance harmony with advocacy for my research in engineering education, particularly my work focused on promoting sustainability education in undergraduate engineering curricula.

4. *How do you see personality dynamics within our cohort contributing to collaboration, community, and identity development in engineering education?*

Diversity in personality is a strength for collaboration, community, and identity development. I believe that an environment should be created where ideas can be shared freely, regardless of differences in beliefs and opinions. People with higher red traits can be assertive and creative, and when combined with harmony and collaboration, this can be significant in addressing issues in engineering education where technical competencies must be integrated with ethical, sustainable, and interpersonal competencies. Engaging and working with a diverse cohort will help refine my identity as an engineering educator and prepare me to mentor future engineering graduates once I assume my role as an engineering education researcher.

Collaborative Autoethnography Reflection Protocol – Talha Naqash

Purpose: To explore how our personalities (as identified through the color test) intersect with our pathways into engineering education and our professional identities.

Step 2: Individual Reflection

Instructions:

Take about 20-25 minutes to respond in writing to any or all the following prompts. Aim for at least one paragraph per question, but write as much or as little as feels meaningful. Your reflections will serve both as personal data and as contributions to our collaborative analysis.

1. *How do you see your personality traits shaping your pathway into engineering education and your goals within the field?*

My personality traits of cognitive engagement, cognitive closure, and critical thinking have played a significant role in my journey through my engineering education and have greatly influenced the way I teach and do research. These personality traits also influence how I provide learning opportunities to STEM students to encourage the use of engaged cognitive processing to deepen the understanding of complex learning instead of relying on memorization. I naturally want to present complex subjects in a manner that allows for the effective integration of new knowledge into a student's understanding, as well as utilize my critical thinking skills to evaluate and improve the effectiveness of my teaching methods based on empirical data.

Throughout my seven years of experience in teaching, I have realized that cognitive engagement fosters higher levels of motivation, better problem-solving abilities, and deeper conceptual understanding in students. This realization has directed my research to find ways to improve learning outcomes in STEM education. My personality motivates me to continuously evaluate and modify my teaching practice to be student-centered, research-based, and to achieve my ultimate goal to promote the growth of engineering education by using the integration of academic research with practical teaching strategies that empower students to be successful and to think critically within their respective fields of study.

2. *What aspects of your color results resonated with you, and what aspects surprised you? How do these connect to your past experiences in engineering or education?*

A number of components from the colors associated with my results were closely aligned with my interest in analytical thinking and stimulating the thinking processes of others. This is also very much in line with my work in the area of engineering education, where I actively work on cognitive engagement issues and support an understanding of the conceptual basis of STEM disciplines in students. Since I can remember, I have always had a strong interest in the types of environments and experiences that allow me to guide

learners through complex challenges and encourage them to take a critical lens to problem-solving efforts and to incorporate multiple components of their knowledge base into their problem-solving efforts. This is why I feel so comfortable in teaching STEM-related courses; this is the result of my combined interests in analysis and my desire to work closely with students.

Another pleasant discovery from my results was the indication of my ability to be flexible in my approaches to teaching and research, and open to multiple points of view. I tend to utilize a very structured, evidence-based methodology in my teaching and research, and I have learned to appreciate that I thrive in situations where I utilize a flexible approach. The creation of student-centered learning activities has made me realize that while planning and organization skills are important in the development of those activities, it is equally important that I create an environment where I can respond to the needs of my students and work with other educators in developing their ideas. Ultimately, these results will enhance my current knowledge of my strengths as a professional educator and give me additional information about how I can continue to progress in the areas of education and research in STEM.

3. *In what ways do colleagues, mentors, or peers perceive your personality? How do those perceptions align or differ from your assessment results, and how has this influenced your interactions in the department?*

Many people who have served as my colleagues or who have been my mentors or peers have described me as a thoughtful, analytical thinker who is very dedicated to supporting student learning. I am considered to be meticulous in my attention to detail, using evidence-based approaches, and supporting critical thinking, especially regarding curriculum design and research ideas. These perceptions align well with the results of a recent assessment I completed, which demonstrate that I think analytically, that I have a focus on cognitive engagement, and use my skills to communicate clearly about structuring complex information.

I have also been surprised to learn that many of my colleagues view my willingness to work with them and my willingness to open my mind to other thoughts was also surprising to me based on my own assessment. I view myself as a very methodical, structured person; however, I was unaware that many of my colleagues perceive me as approachable, flexible and adaptable, especially when working with my colleagues on team projects and mentoring students.

The perceptions of my colleagues regarding my style of interaction within my department have greatly influenced the way I have approached my work. I have learned to maintain a balance between structure and flexibility, to seek feedback from my colleagues and to develop a culture of collaboration and shared problem-solving. By understanding the way others see my personality, I have been better equipped to develop quality professional relationships and create an engaging and supportive climate for my colleagues and students.

4. *How do you see personality dynamics within our cohort contributing to collaboration, community, and identity development in engineering education?*

The relationship between an individual's personality traits and the dynamics present when working collaboratively within a group (cohort) is instrumental in shaping the way members collaborate, develop community, and build identity as engineers through their participation in engineering education programs. Different personality traits contribute complementary strengths to teamwork and group dynamic interactions. Students and faculty are able to approach problems from multiple perspectives; analytical and structured thinkers create clarity and provide necessary systematic methods for solving problems, while individuals who are socially connected are more likely to establish open dialogue and build trust and shared understanding.

The dynamics that manifest as a consequence of having different personality types within a group support the collaborative process by encouraging the combination of both critical thinkers and creative thinkers in a learning environment, providing the ability for faculty members (as models) to demonstrate effective teamwork and mentoring, and contributing to building community among group members as they learn to respect and communicate with one another. Personality differences also expose students to a broader range of ways in which engineers think, approach challenges, and engage with other engineers; therefore, they will assist in developing professional identities.

So, being able to identify and take advantage of the different personality dynamics will have a positive impact on the learning process and will provide many opportunities for future professional development; thereby providing the basis for an intellectually demanding, collegial, and adaptable culture of engineering education, which will be essential to success in STEM areas.

Collaborative Autoethnography Reflection Protocol – Gabe Van Dyke

Purpose: To explore how our personalities (as identified through the color test) intersect with our pathways into engineering education and our professional identities.

Step 2: Individual Reflection

Instructions:

Take about 20-25 minutes to respond in writing to any or all the following prompts. Aim for at least one paragraph per question, but write as much or as little as feels meaningful. Your reflections will serve both as personal data and as contributions to our collaborative analysis.

1. *How do you see your personality traits shaping your pathway into engineering education and your goals within the field?*

Since I am mostly a white personality type, I am mostly motivated by decreasing conflict and trying to make sure everyone is happy/content. Because of this, even though I've often done well in school, I empathize when people are struggling, which makes me think a lot about why they are struggling, and of course, what could be done differently. I've also spend a lot of time tutoring and helping my peers, and I've come to realize that I enjoy teaching quite a bit. My current goals are pretty well aligned with this as well, because I've mostly been interested in figuring out how people learn so that I can improve my teaching.

2. *What aspects of your color results resonated with you, and what aspects surprised you? How do these connect to your past experiences in engineering or education?*

I've known for a long time that I struggle with conflict. I've done a bit of work getting to the point where I'm actually comfortable when conflict is necessary (and I'm still not all the way there). So that resonated with me and didn't surprise me. I am the most comfortable when everyone in the room understands the content and is not dissatisfied or upset, which aligns well with wanting to improve teaching.

3. *In what ways do colleagues, mentors, or peers perceive your personality? How do those perceptions align or differ from your assessment results, and how has this influenced your interactions in the department?*

I think most of my colleagues, mentors, and peers perceive me as a kind person who always tries to get along with everyone, but I also wouldn't be surprised if some of them have noticed that I can be a little rude or blunt, which doesn't align well with being a white personality type. This is mostly just because I appreciate honesty and clarity, so I am sometimes surprised when others don't feel the same way. I don't think it's influenced my interactions with others in my department much because most of the others here are also very understanding and quick to assume the best in those around them.

4. *How do you see personality dynamics within our cohort contributing to collaboration, community, and identity development in engineering education?*

I would say that the personality dynamics within our cohort have helped create a strong sense of community and support, but perhaps they have detracted from collaboration. When someone needs help or wants to collaborate, then everyone is willing to help. However, I think that people are sometimes hesitant to ask for help or collaboration, so maybe this happens less than it otherwise would. For identity development, I think most people are aware that it is very easy to feel like an imposter, so we are very open about sharing our experiences and making everyone feel like they belong.

Collaborative Autoethnography Reflection Protocol – Foeday Zinnah

Purpose: To explore how our personalities (as identified through the color test) intersect with our pathways into engineering education and our professional identities.

Step 2: Individual Reflection

Instructions:

Take about 20-25 minutes to respond in writing to any or all the following prompts. Aim for at least one paragraph per question, but write as much or as little as feels meaningful. Your reflections will serve both as personal data and as contributions to our collaborative analysis.

1. How do you see your personality traits shaping your pathway into engineering education and your goals within the field?

Being mostly YELLOW and BLUE really explains a lot about why I chose engineering education. My YELLOW side loves fun, creativity, and connecting with people. I enjoy making learning exciting and engaging, and I like bringing energy into group work. On the other hand, my BLUE side values relationships, trust, and doing things with quality. I care about making a real difference and helping others succeed. These two parts of me work together—I want to create learning environments that are both enjoyable and meaningful, and I want my research to have a positive impact on people's lives considering all diverse learners and individuals needs.

2. What aspects of your color results resonated with you, and what aspects surprised you? How do these connect to your past experiences in engineering or education?

The YELLOW part felt very true because I've always been outgoing and love working with people even though people in the team sometimes see me to be the lead, I am easy to accept what my teammates propose to our project. I like being creative and making things interesting, whether it's in class or during presentations. The BLUE part also made sense because I'm very loyal and I take my work seriously; I want it to be done well and to help others. What surprised me was how strong the BLUE side was. It explains why I'm so focused on ethics and quality even though I also like having fun. Looking back, this mix shows up in my past experiences: I enjoy researching and sharing my ideas while also networking, but I also spend a lot of time making sure my research is solid and meaningful.

3. In what ways do colleagues, mentors, or peers perceive your personality? How do those perceptions align or differ from your assessment results, and how has this influenced your interactions in the department?

People usually see me as friendly and positive, which matches my YELLOW side. They also know I'm dependable and committed, which is very BLUE. These perceptions fit

well with my test results. Because of this, I feel comfortable being myself—I can bring energy to group projects and also be the person who makes sure things we accept each other views the right way. I am always the person to point at someone to lead our team. Even though my friends always see me as their leader, I love to share responsibility with other. This balance has helped me build good relationships in the department and take on leadership roles without feeling like I have to change who I am.

4. *How do you see personality dynamics within our cohort contributing to collaboration, community, and identity development in engineering education?*

I think having different personalities in our cohort makes us stronger. For instance, my YELLOW side helps create a fun and welcoming environment where people feel comfortable sharing ideas. My BLUE side helps build trust and deeper connections, which makes collaboration easier. When we combine all our personalities, those who like structure, those who bring energy, those who value peace, those who want leadership, those who manage people, those who want to organize programs, and research projects, we create a community that supports everyone. This mix helps us learn from each other and grow as future engineering educators.