ASEE AMERICAN SOCIETY FOR ENGINEERING EDUCATION

Paper ID #36473

FRAMING CULTURAL BRIDGES FOR RELATIONAL MENTORSHIP

Dr. SYLVANUS N. WOSU, University of Pittsburgh

Sylvanus Wosu is the Associate Dean for Diversity Affairs and Associate Professor of mechanical engineering and materials science at the University of Pittsburgh. Wosu's research interests are in the areas of impact physics and engineering of new composit

©American Society for Engineering Education, 2023

The Roles of Relational Mentorship in Building and Supporting Cultural Bridges in Graduate Education

Sylvanus N. Wosu

University of Pittsburgh Swanson School of Engineering, Pittsburgh, PA

Abstract

Effective mentorship is a key factor for driving success in completing a doctoral program or achieving tenure in the professoriate. The effectiveness of a mentor-leader in engaging and empowering mentees depends on the mentor's ability to influence desired attitudinal or performance character changes. This takes place through relational connections for interaction of values, attitudes, behaviors, and principles that are nurtured, constructed, and practiced, building and supporting a mentee-mentor cultural bridge to achieve the desired goal. The mentor and mentee enter the relationship with unique identities and self-cultures that must be transformed, and boundaries crossed in the mentorship process. Such a *mentorship cultural bridge* is designed to relationally connect mentor and mentee to each other in functional and impactful ways, with goals to discover more about each other's culture, build relational trust and empathy, practice relationship building, improve cross-cultural communication skills, and provide a pathway to improved understanding and valuing of differences. Moreover, this cultural bridge should make graduate education mentorship a mutually beneficial effort and inspire mentees to be successful in a competitive culture of high expectations, such as preparation for and success in a Ph.D. program or mentoring a junior faculty member toward making tenure.

This paper introduces a *mentorship cultural bridge* within the framework of *Relational Mentorship Model (RMM*), with a focus on the strategies and acts of effective menteeship and mentorship for increasing the success of engineering doctoral students, especially those from under-represented groups, in a research intensive setting. The key tools provided in RMM include: strategies for developing effective mentoring relationships for the general growth of the mentee; understanding the critical characteristics of *followership or Menteeship* and how relational mentor-leader can be transformational in positively inspiring growth and higher independent performance skills on mentees toward desired success; and developing mutual trust to jointly cross the mentorship cultural bridge in a transformational mentorship process. Holistically, the paper explores how mentorship empowers participants for further success and growth on both professional and personal levels, inside and outside of higher education. An extensive discussion of research evidence on the barriers minority students face in graduate school, challenges majority faculty face in cross-racial and gender mentorships, and suggestions on how to address the identified barriers, make this exploration applicable for any faculty or graduate students who desire to maximize the opportunities from relational mentorship.

Topic Index: Cultural bridge, relational mentorship, menteeship, graduate education, model

Introduction

Mentorship in general is an act of guiding someone to achieve success through a relational connection with a more experienced person. In academic settings, mentoring is a collaborative process of academically challenging, encouraging, and guiding a mentee (a student or junior faculty member) to excel in the desired goal through a relationship with a mentor or more experienced colleague. The mentorship model stems from the belief that a successful mentoring partnership is a voluntary, developmental, sharing, empowering, and encouraging relationship. Effective academic mentoring is an aspiration model that focuses on inspiring students to be successful in a competitive culture of high expectations, such as preparation for and success in a Ph.D. program or tenure-stream positions. The primary strategy is to identify mentees with dreams of success and perseverance to pursue those dreams, and match the mentee with a mentor who believes in the mentee and guides him or her to shape those dreams into reality. In those realities, cultural barriers due to their differences do exist both for the mentor and mentee that must be understood, negotiated, and navigated.

Barriers in Graduate Education for Students from Underrepresented Minorities

Dealing with barriers to increasing the numbers underrepresented minorities (URM) in STEM, including Latinas/Latinos, African Americans, and Native Americans, remains a challenge due to a lack not only of tested strategies to understand the reasons for the barriers but also a framework for effective aspiration that addresses those barriers to improve the access, retention, and successes of URM in STEM education. For example, URM faculty are almost nonexistent in science and engineering departments at research universities due to this lack of access compared to majority [1]. Thus, URM students are likely to find themselves without URM faculty needed to serve as optimal role models as those that "look like them," and non-URM faculty members who are willing to engage in cross-racial mentorship often lack the multi-cultural competence to be comfortable in that role.

These barriers limit the number of URMs completing the PhD in STEM and advancing to the professoriate. The overall fraction of engineering doctoral degrees awarded to URM groups relative to the fraction of these groups in the U.S. population has remained relatively flat for the last three decades. A comprehensive review of the subject [2] identified barriers and inequalities that impede the URM inclusion and success in STEM education. With respect to role of mentorship as a subject of this paper, the barriers and inequalities that can be addressed in a functional mentorship process, include: 1) **Systemic perception of inadequacies of URM**, where measures such as low GRE scores, low self-confidence, and perceived less rigorous preparation prior to graduate school are used by departments to explain differential experiences and outcomes among students [3]-[5] and create unequal financial support opportunities for URM students, even with comparable GPAs; 2) **Unique lived experiences of URM [6], [7]; 3) Struggles with sense of belonging** [8], which make them more likely to face the challenge of adaptation to a culture outside their lived experiences and the lack of diverse faculty that share their background and values exacerbates the situation. We have seen in the PITT STRIVE Program (PSP) that where there was a low critical mass of URMs, as in most STEM departments, a good mentorship, welcoming and nurturing educational community were supportive of URM students' cultural identities and helped them cope with feelings of isolation [5], [9]; 4) **Exclusionary practices** perpetuated by power differentials between people in the system sets the "others", usually URMs, apart from everyone, sending a micro-aggressive message that the "others" are different and do not belong in the same ways as "us", stigmatizing

those deemed to be “other” [10], with the perception of “other” often a result of race-based implicit bias that leads to unjust practices that single-out, overlook, discount, exclude, or ignore URMs [11], [12], and thus URM students enter into a graduate program or a mentorship relationship with less trust in systems or mentors; 5) **Climate of micro-inequalities** often collectively normalized in the system’s support for victims that can impair performance, diminish self-esteem, impede self-confidence, and in some cases, lead the victim “voluntarily” to leave the environment [2], [13]; 6) **Lack of faculty diversity** leads URM students struggle with a lack of minority faculty role models who “look like them [2]”; 7) **Race-based discrimination and implicit biases** [13]-[17]; and 8) **Unwelcoming and unsupportive campus environment** that is noted to make the completion of doctoral degrees more difficult for URM in STEM [8]. The lack of system level supports to dismantle these barriers exacerbates such an already systemically exclusive environment.

Despite the general agreement that female and URM students benefit greatly from functional mentorship relationship in a predominant majority culture, resistance still exists in those cultures for several reasons, including challenges in establishing healthy mentoring relationships with their white faculty mentors and a lack of strategies for institutions, faculty, and students in dealing with these challenges [18]. Minority graduate students are more likely to experience isolation in graduate school and less access to mentors and role-models than their non-minority peers [19] and even when mentoring relationships exist, faculty in general do not always have the competencies or formal training required to effectively mentor *any* student. These challenges have negative impacts on URM graduate students entering, completing STEM doctoral degree or advancing to the professoriate. A mentor demonstrating understanding and effective empathetic communication and belief in the student can play a key role in helping a mentee deal with these negative perceptions. However, the faculty members also are faced with their own barriers and apprehensions for effective engagement in a mentorship process. The following three observations are common among 67 STEM faculty members surveyed [20]:

Relational Communication and cultural competence. Communication and awareness of URM challenges seem to be major issues with mentors: white faculty mentors feel discomfort giving feedback and often are fearful of saying something “wrong” to students; mentors feel URM first year students lack understanding of expectations and what graduate school is all about; and mentors feel URMs are not seeking advice nor are they taking full advantage of opportunities to learn in the lab. Faculty have little ability to appreciate the lens through which URM students are viewing the world around them with a tendency to overestimate their cultural competence and less awareness of racial bias. Mentors are less aware that URM students might have faced a significant amount of racial bias leading up to their graduate career. Most majority mentors are not aware of the differences pertaining to the influence of family on themselves and the URM students, and that many URM students are not getting the same parental support for further education that the faculty received.

Undervalue of URM educational experience. Implicit bias about the quality of *HBCU* education and majority faculty’s lack of appreciation for the social and academic adjustments that URMs are making when transitioning from HBCUs or non-research institutions to research intensive majority institution. A study by [21] involving 43 female and URM STEM faculty and 32 URM and female business faculty, examined how members of these group were encouraged through mentoring during their graduate studies to transition to academic positions, how they are

mentoring their current students to academic positions, and some barriers in mentoring underrepresented students toward academic careers. The study found that 42% of engineering and 47% of business respondents reported a faculty member and/or academic advisor/mentor as a particularly influential person in their career path; faculty/advisor influence was true for both men/women and majority/minority faculty; specific factors that made a difference in the students' academic, social, and professional success were family support and financial assistance for engineering faculty, and mentoring and networking for business faculty; 59% of engineering and 47% of business respondents agreed or somewhat agreed that mentoring should be done differently based on gender; and 64% of engineering faculty agreed or somewhat agreed that mentoring should be done differently based on race/ethnicity, while 42% of the business faculty disagree or somewhat disagree that mentoring should be done differently based on race/ethnicity. The minority faculty in the survey believed that major barriers exist to women and/or URM students pursuing academic careers including [21] a lack of role models and aspiration peers, climate issues of racism and/or sexism, and a current system that is inherently discriminatory and does not promote success among underrepresented groups.

Barriers to white faculty establishing effective mentoring relationships. Barriers to white faculty and URM graduate students establishing relationships include: implicit belief, bias, and relational cloning (perception of mentoring as a pathway to reproduce in a mentee a professional similarity to a mentor); discomfort for negative feedback; lack of multicultural competence [22]; poor relational communication abilities; double disadvantage for female STEM faculty (gender and underrepresentation) who are likely to experience greater feelings of isolation and belongingness; and departmental non-inclusive culture, climate, and poor receptivity to DEI values.

In general, negative mentoring experiences by students' impact their satisfaction with their departments and overall education, their decisions to choose academic careers, and their ability to engage in the mentoring of their own future students [18]. Table 1 summarizes the barriers discussed above under two classes: 1) Race- or gender-based systemic barriers, and 2) Barriers to effective relational engagement.

Table 1. Barriers to URM graduate education and effective mentorship

Race- or gender- based systemic barriers	Barriers to effective relational engagement
1. Unequal financial support and opportunities	1. Ethnocentric tendencies—belief that one's culture is more superior
2. Perceived inadequacies	2. Cultural destructiveness-belief in rights and privileges for dominant groups only
3. Unique lived experiences	3. Cultural blindness— ignoring or denial of differences
4. Sense of belonging in "others" culture	4. Cultural competence and sensitivity— recognize and valuing differences in others
5. Power differential of differences: "us" vs "others"	5. Cultural proficiency—practicing inclusive behavior

6.	Insensitive environment to dismantle barriers	6.	Intercultural competence skills (self-awareness, inclusive behavior, sensitivity)
7.	Climate of micro-inequalities	7.	Receptivity and Resistance to inclusivity
8.	Discrimination and implicit biases	8.	Minimization of differences—tendency to assume cultural universality or apply one's culture to other's
9.	Limiting academic culture and climate	9.	Fear and Discomfort for negative feedback
10.	Lack of minority faculty role models	10.	Cross-cultural communication abilities
11.	Unwelcoming and unsupportive campus environment	11.	Double disadvantage for female or URM STEM faculty
12.	Undervalue of URM educational experience or preparation	12.	Departmental non-inclusive culture and lack of intentionality to DEI

Understanding the Rationale of Mentoring

The above barriers could explain why STEM graduate education needs intentional effective strategies through a holistic mentorship model for supporting female and URM students' successful completion of doctoral studies. Such a model must be informed by research and ways to retain graduate students, including: 1) preparation for and understanding the culture of graduate school; 2) providing balanced information about graduate programs and their requirements; 3) continuous monitoring of academic and research progress; and 4) fostering of continuing and challenging opportunities for professional growth. Effective mentoring engagements must be within the limits of healthy mentoring relationship, defined as *functional mentoring* [18]. Benefits of functional mentoring to mentees include guidance, support, feedback, and enhanced networks. The benefits from the guidance provided by mentors include academic guidance, career development, personal guidance, and overall aid in the socialization of the graduate student. Mentors' correct feedback can benefit mentees by helping them survive graduate school, promoting the professional and career development of mentee, and providing the right directions. A longitudinal study on the effect of mentorship on the research productivity, career commitment, and self-efficacy of Ph.D students in STEM found that mentoring positively impacted productivity and self-efficacy [22].

Individuals in informal and formal mentorships reported more favorable outcomes than non-mentored individuals with respect to organizational socialization, job satisfaction, and salary [23]. However, a mentor must pay careful attention to assumptions made in the challenging circumstances which students face. Ethnic differences require that mentors develop a "flexible cultural lens" to appreciate the unique contributions of the mentee's traditions while simultaneously recognizing that there is much individual variation within cultures [24].

A study by [14] examined the relationship between students' demographic and academic characteristics (age, gender, citizenship, academic discipline, and stage of persistence) and their preferences for three styles of mentoring as assessed by the Ideal Mentor Scale (IMS): Integrity, Guidance, and Relationship. The study concluded that "graduate students' perceptions of the ideal mentor are influenced somewhat by major socio-cultural factors, but also suggest that individual differences may play a larger role" [25]. Mutual respect fosters an environment of strong relationship for effective engagement and attracts students who commit and want to

follow the mentor because, relationally, the students are motivated by the sense that the mentor cares for them more than his or her positional rights, and so are willing to follow in their mentor's directives. Mentoring practices of recipients of the Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring (PAESMEM) were analyzed to characterize effective strategies for mentoring minorities within STEM fields. The results showed that PAESMEM mentors developed successful mentoring outcomes for underrepresented students in STEM fields through creating an organic relationship between mentor and mentee, characterized by mutual respect [26].

Overcoming Barriers through Mentorship Relationship

With the continued underrepresentation of female and minorities in STEM education and the systemic race-based mindset culture and climate that marginalizes their academic abilities, competencies, as well as with their unique cultural perspectives, there is need for closer and intentional attention to help faculty develop the qualities needed to effectively mentor graduate students from this group. In general, these barriers can be experienced by any graduate student or faculty mentor, but because of other silent issues, including cultural differences, the dearth of minority faculty, underrepresentation, backgrounds, and a dominant unfamiliar culture, these barriers tend to affect female and URM students more than others do. Granted, there are many excellent and successful cross-gender and cross-racial mentorship relationships, but an effective model is needed as a tool to equip more mentor leaders and make the work easier.

This paper proposes a Mentorship-Cultural Bridge (MCB) within the Relational Mentorship Model (RMM) developed by [27] to address barriers at an interpersonal level. MCB refers to strategic and intentionally inclusive behaviors that break down barriers and create connections between mentor and mentee to achieve desired goals. As demonstrated in Figure 1, the cultural bridging activities are self-cultural awareness and transformation strategies and cross-cultural relational communication skills, strategically applied to align mentor and mentee across cultural differences with mutual trust and understanding that allow them to break free from their original cultural patterns and orientation towards cultural differences. Each mentor and mentee in their own culture must self-transform their own inclusive attitude to allow for cross-cultural communication across boundaries.

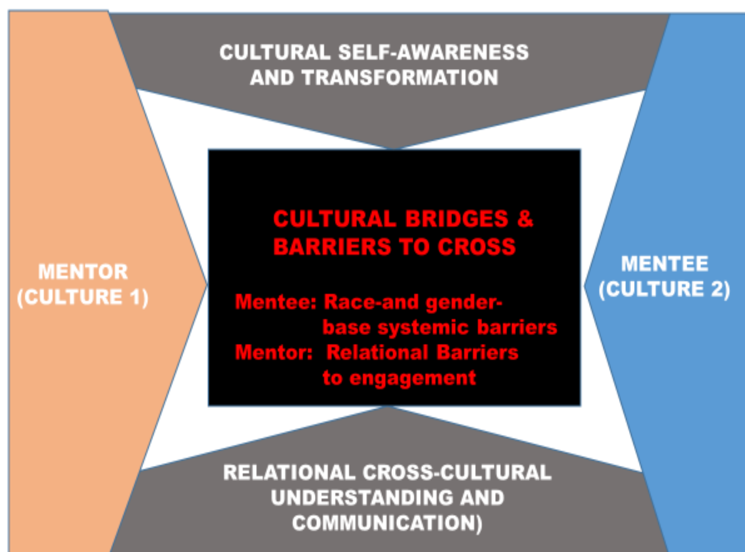

Figure 1: Mentorship-Cultural Bridge (MCB) in Relational Mentorship model (RMM)

Increasing Multi-cultural Competence

Increasing multi-cultural competence for both mentor and mentee is a critical first step in breaking race- and culture-based barriers. Multi-cultural competence is a set of skills or abilities to shift cultural perspective or suspend biases and adapt behavior to cultural commonality and differences. Culturally competent people think and act in ways that allows them to interact appropriately across other people's cultures. Faculty, students, and institutions share in the responsibility to remove the barriers, or at least effectively mitigate their impact, caused by the lack of multi-cultural competency. The pathway toward overcoming these barriers, for example, incorporates three strands of intercultural dynamics: self-transformation (cultural self-awareness), transformation of boundaries, and transformation of multi-cultural settings. As shown in Figure 1, with respect to a mentee or student (with self-culture 1) and mentor/faculty (self-culture 2), the two are separated by identity or culture-imposed boundaries. Breaking the barrier or boundary begins with intentional transformation of self by being aware of one's intercultural orientation to differences, awareness of the others challenges and working on oneself to understand and cross the cultural bridge to meet each other in the middle. It also means the transformation of the dominant culture to give access to the minority culture. Relational communication across and between faculty culture and student culture, for example, results in the transformation of the boundaries. Multi-cultural transformation occurs when there is a seamless interaction across the boundaries. It is important to note that even in such interaction, not only their orientation to the cultural differences changed but also their cultural competency increased while they both maintain their identities and culture. Also, their mindsets and orientations to each other's difference and the adaptation/adoption of behavior for interaction and functional relationship in the integrated culture changed. Other strategies to increase multi-cultural competence include the following: raising awareness of blind spots and related implicit bias and dealing with them through better communication; encouraging each member of the team to be fully self-aware of his/her orientation to differences; and framing multicultural competence as a joint problem between mentor and mentee for deeper understanding. The strength of the cultural bridge they build depends on the effectiveness of their cross-cultural communication and cultural competence.

Mentorship: A Relational Followership Tool

The contextual review above casts a non-exhaustive glimpse into our understanding of mentoring but critically informs the design of RMM. For the purpose of this paper, we explore answers to the questions: what evidence-based strategies enable mentor, mentee, and organization to build cultural bridge to deal with the mentorship barriers, how does formal mentoring work in practice in the context of creating a bridge that allows a mentee and mentor to connect despite their cultural differences and backgrounds, and what are the roles of relational mentorship to equip mentor and mentee to cross the cultural bridge in higher education? In framing such a bridge, we define *Relational Mentorship* as a followership process involving the connection and mutual trust between an experienced someone (mentor) influencing and guiding appropriate success attitudes, and personal and professional growth of the less experienced someone (mentee). Relational mentorship influences desired success attitudes in a mentee by nurturing interpersonal relationships, communication, and mutual trust that intellectually inspire the mentee to develop and follow his or her own sought-after growth plan.

Description of Relational Mentorship Model

In the context of understanding how formal mentoring allows a mentee and mentor to connect and cross each other's cultural boundaries to create and sustain excellence toward desired goals, this paper proposes the adaptation of Relational Mentorship Model (RMM) described by [27]. The model posits that effective mentoring is achieved with relational mentorship involving interpersonal processes through which the interactions of values, attitudes, behaviors, ideologies, and growth are nurtured, constructed, and practiced to connect and relate to one another in order to self-transform to cross each other's self-culture. A positive interpersonal relationship is an inner driver that empowers mentee's motivation to be engaged because of his/her sense of trust that the mentor cares. When pulled together, [27] argues that positive influence and interpersonal relationships start from the inside of an authentic mentor-leader with willingness and relational connection to serve a less experienced mentee.

RMM consists of five relational connecting dimensions (Mentor, Mentee, Organization, Community, and Functional Relationship). As shown in Figure 2, the primary *input* into this model is the engagement of the first four dimensions with Functional Relationship as the *output* of that engagement, and the success and growth of the of the mentee as the desired *outcome* and measure of the effectiveness of the mentorship process. The elements of these dimensions are described below:

1) **Mentee or protégé** — an individual (student, junior faculty, or staff member) with less experience in comparison to a mentor with more experience, but who is open to engaging in functional relationship with a mentor to further his or her career or personal growth. A mentee is a good follower or apprentice of an experienced leader in whom he/she believes and is committed to the mentor-mentee relationship based on mutual trust and connection.

2) **Mentor** — Typically, a mentor is an experienced person who provides guidance, facilitating the transition from one point of a life goal to another. A mentor serves as a role model, counsels the mentee on different topics of concern, and offers insights and perspectives on any topic of interest to the mentee. The mentor plays the role of supporting, pushing, and influencing the mentee to adopt the desired learning behaviors, strategic thinking, and the necessary experiences that will enable the mentee's dream (ambition) to come true.

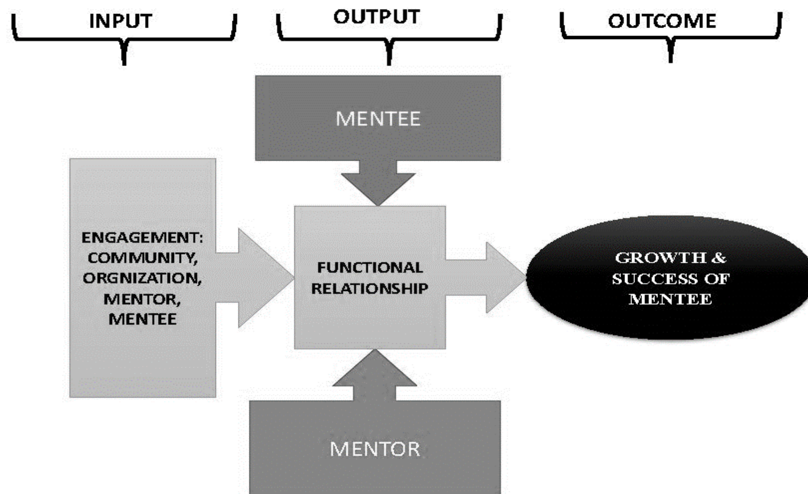

Figure 2: Relational Mentorship model (Wosu, 2016).

Key characteristics of an effective relational mentor include: willingness and commitment to the growth and development of a mentee through guidance, feedback, and challenge for higher achievement; having discipline-specific knowledge and willingness to reproduce the same in a mentee; demonstrating effective empathetic verbal and nonverbal communication skills; fostering of the mentee's willingness and ability to follow a path of academic achievement; possessing emotional intelligence and self-regulated emotions to handle other's emotions; sensitivity to the emotions and feelings of the mentee; willingness to intellectually stimulate students, even in challenging times; and ability to commit an appropriate amount of time to support the mentee's growth.

3) **Functional Relationship** — the growth of the mentee is achieved through the collaborative partnership and relationship with the mentor. In the context of RMM, *Functional Relationship* is a healthy mentee-mentor connection, association or collaboration with a high degree of reciprocity that results in both the success and satisfaction of the mentor and mentee. Reciprocity is a mentor-mentee give-and-take relationship in which the mentor extends respect, guidance, and support to a mentee and in turn requires and expects some tangible benefit from the mentee's response as a necessary outcome of the mentoring relationship. Mentoring relationship changes over time as the mentor and mentee grow, learn, gain experience, and develop mutual interests in the relationship. The mentor-mentee relationship, which is shaped to promote advanced academic achievement, for example, can focus on three major areas: *(1) Mentee Growth and Retention,* (2) *Professional Advancement*, and (3) *Transition to Professional Work or Graduate School.* A mentorship relationship takes different forms and settings depending on the context in which it is set — formal or informal, higher education student-to-student, faculty-student, faculty to faculty, or among groups. Faculty to student relationships are created with a focus on fostering a student's growth opportunities or transition to career or graduate school. These forms are time-intensive, often involving personalized monthly one-on-one mentorship meetings outside of the regular lab research activities.

4) **Community Connections**—The separate communities in which the mentor and mentee

belong, within and outside the organization, can have a direct influence on the mentee-mentor relationship by its influence on the relational trust. Association with a group of faculty mentors that share negative perception or lack of experience in mentoring a certain ethnic group can have an effect how that faculty views mentoring of students from that group. Similarly, students from an ethnic background different from the mentor are more likely to be apprehensive at the initial stage of the relationship. Students often are more experienced in interacting with people that look like them. When it comes to faculty mentoring, especially cross-race faculty mentoring, a majority of administrators and senior faculty agree that mentoring is important and want to provide support but are "likely to be perplexed by the task because they may have no previous experience with minority colleagues to draw upon" [28]. The mentor and mentee must work to nurture their communities in ways that will not only promote the success of the mentee but also ensures trust and understanding in the relationship. For the mentor, nurturing the community of mentors with whom the faculty is associated, means:

- Creating a shared vision among vested faculty on the value of cross-racial or cross-gender mentoring
- Serving as an agent of change in the perception of his or her faculty colleagues on mentoring of underrepresented and female students
- Leading other faculty to embrace diversity-mentoring by his or her own intentional efforts and examples
- Being intentional and self-aware that all students do not share the same background; some students, due to no fault of their own, may need extra push in an unfamiliar culture
- Nurturing the mentor's community means being aware and educating others of the challenges and barriers that some students face and being open to assist such students whenever possible, without condescension
- Sharing with colleagues, an inclusive mindset that promotes an environmental climate and faculty culture that ensure that all students are valued and respected

5) **Empowering Organization**—The Relational Mentorship is directly or indirectly connected to the organization through organizational acts of empowerment. Formal mentorship is developed or cultivated in an organization—academic or corporate unit, school/college, department, research center—to empower the culture in which mentorship thrives. Relational connections are strengthened in a formal mentoring process when supported by the leadership of the mentee and mentor's organization. The relational mentorship connections can be supported in an organization through the following three empowering high-performance integrative dimensions illustrated in Figure 3: 1) organizational culture, 2) empowering academic culture, and 3) inclusive organization climate.

6) *Organizational culture.* The primary role of the organization is to create an enabling culture that empowers the process; an enabling system of beliefs, values, and environmental climate that supports the effective functioning of the three relational dimensions (mentor, mentee, relationship). Formal mentoring does not just develop spontaneously; relationships are intentionally created with specific purposes and desired outcomes in mind. According to [29], organizational culture is a "pattern of shared basic assumptions learned by a group as it solved its problems of external adaptation and internal integration (…) a product of joint learning." [29] concepts of organizational culture are represented as layers of dominant

assumptions a person, or a group makes about the group to which they belong.

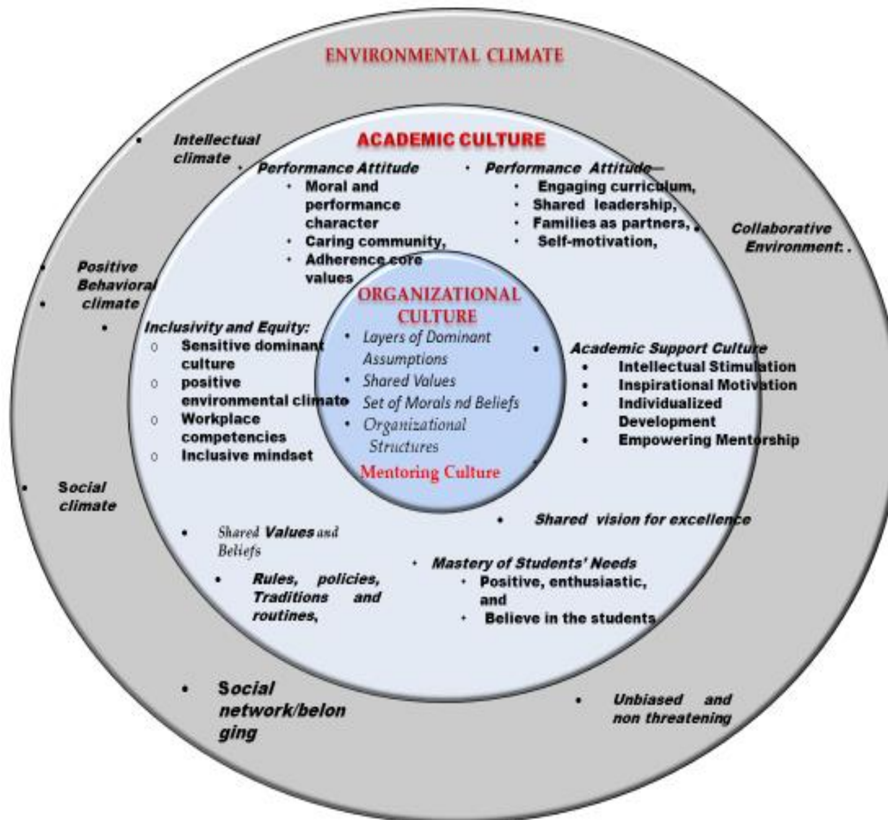

Figure 3. Integration of empowering high-performance culture consisting of organizational, academic cultures, and environmental climate

The mentorship culture shares some elements in [29] representation. *Mentoring Culture* is a subculture within the organizational culture. It refers to dominant organizational shared belief and value of the practice of mentoring within the organization, promoting multiple mentoring opportunities, and building in support mechanisms to ensure individual and organizational mentoring success [30]. The presence of the following eight hallmarks were suggested by [30] for progressive support and sustenance of the mentoring culture: *Accountability* of shared intention, roles, responsibilities, ownership, tasks, commitment to action, and consistency in the practice of mentoring; *Alignment* of mentoring activities and desired outcomes; *Communication* mechanism for developing mentoring readiness, generating learning opportunities, and providing mentoring support within an organization; *Value and visibility* by sharing personal mentoring stories, role modeling, and best practices by the example of mentors; *Demand* and self-seeking interest to participate in strengthening and developing themselves through mentorship; *Multiple mentoring opportunities* created to advance and support multiple types of opportunities; *Education and training* strategically integrated into the organization's overall training and development agenda; and *safety nets* to overcome or avoid potential stumbling blocks and roadblocks with minimum repercussion and risk, and just in time support to enable mentoring to move forward coherently.

Empowering academic culture. Academic culture is the shared and learned system of

morals, values, and beliefs that shapes and influences policies, people's perceptions, and behaviors in an academic unit. The academic culture of faculty (faculty culture) in higher education generally consists of teaching, scholarly research, and service in the context of the university's mission and purpose. Academic culture can be characterized by expectations for high achievement in all core areas and focus on quality, scholarly contributions and innovations; including expectations of infusion of diversity experiences, cross-cultural elements, and diverse perspectives into the curriculum and admissions decisions. The starting point of establishing a good academic culture of excellence that includes a mentoring culture is to create effective communication of appropriate student's expectations and ensure that students understand what those expectations are, their roles in meeting them, and how faculty mentoring relationship can help. A good academic culture empowers intellectual climate and stimulation, and effective teaching to produce better and well-developed students by ensuring the presence of the following:

1. *Inclusivity and equity*—Good programs ensure that the academic culture includes and engages all students in the learning experiences with an intentional effort to see that all students perform at and above the standard. They teach educators that excellence is possible for all students and that one can make excellence inclusive by making the dominant culture sensitive to assumptions, biases, and behaviors that are not respectful of the differences in the organization by breaking down all unconscious bias, stereotype behavior, micro-coded messages, and the sense of privilege for the dominant group. Good programs create a positive environmental climate that focuses on the retention of all students, especially students racially and ethnically different from the dominant group while providing all students with positive learning experiences; developing workplace culture of excellence that supports diversity high performance and achievement for the workforce and student body. They promote the concept of diversity and inclusion as a mindset that is intentionally self-conscious and respectful of all differences without bias.
2. *Quality academic support*—Good organizational culture develops or fosters academic mindsets for excellence, with strong or extra support for students to be in equity with others, such as tutoring and mentoring, to reach the expected standard. Such culture is uncompromising on excellence or standard but provides room and individualized support for all students to work toward reaching that standard. It acknowledges that students have different prior backgrounds and factors in those differences in its academic offering without bias.
3. *Understanding individual student's needs*—Good organizational culture fosters a climate in which the educators are intentional, positive, and enthusiastic about the students' progress. Educators are fully committed to seeing each student succeed and have a good understanding of what students need and strategies to provide the needs to make each student successful. They intentionally expose students to intellectually challenging content and guide them to learn how to reach mastery of the content.
4. *High Performance Attitude*—a success attitude and mindset to do well in whatever is worth doing to impact and achieve excellence**.** This involves intentionally fostering moral and performance character through every phase of graduate school life, creating an engaging academic curriculum, and fostering students' intrinsic self-motivation for excellence and adherence to high standard.

5. *Inclusive environmental climate*—environmental climate refers to how students, faculty, and staff perceive and experience an academic unit's or school's environment or the dominant "environmental" conditions (attitudes, inclusion mindset, behaviors, and standards) of an academic unit or school's workforce and student body with respect to the access to, inclusion of, and sensitivity to individual differences, potentials, group needs, similarities, and abilities . Inclusive school climate can be characterized by *a positive inclusion mindset* and a climate of "high support and high expectations for both achievement and behavior produces the best results" [31],[32]. A *positive inclusion mindset* in an organization reinforces the people's intentional efforts and behaviors of "making excellence inclusive," where all stakeholders—parents, students, teachers, and administration recognize that academic excellence means that all must play his/her role to be effective in STEM academic support; all must recognize hard work on the academic subject areas that matter most.

The academic culture described above often has some unseen intractable elements, such as embedded assumptions and beliefs, that must be transformed for the mentorship process to take off and work well. Strategically, the organization must intentionally encourage the development of practice of mentoring as a value proposition in all of its academic dimensions, students, faculty, staff, and subgroups through the following strategies: Align mentoring culture and process with organization's culture; Align desired mentoring outcome to the organization goals and expectations; Promote mentoring opportunities that academic learning needs in the organization; Select and build a mentoring model that fits the organization culture and desired outcomes; and Provide support, structures, and practices to support group and individual mentoring activities.

A Relational Mentorship Model Implementation

An integration of these five dimensions of mentorship (mentor, mentee, functional relationship, organization, and community) to relational trust and connections is shown in Figure 4. This model can be implemented through various types of mentoring mechanisms. The effectiveness of the mentoring plan depends on the trust relationship and the motivation of the mentee to willingly engage in the growth opportunities created by the mentor.

Implementing RMM as a functional mentoring process involves creating a healthy mentoring relationships shown to be critical in preparing graduate students for careers [33]. Functional mentoring results in both the success and satisfaction of mentees in academia [34], business (Burke, 1984[35], [36], and education [37]. Characteristics of mentors that promote functional mentoring relationships of mentees of any category include being knowledgeable, experienced, visible, willing, and powerful [18].

While *trust* is the main driver to crossing the mentorship-cultural bridge for many female and URM students to participate in mentorship relationships, the commitment of the mentor to intentionally *connect* with the mentee and guide his/her growth is a complementary key to the mentoring success. The organization also plays a key role in providing the positive culture and climate that enable that connection to take place by removing any obvious impediments, such as any lack of resources, and allowing for incentives that may be needed. The working relationship between a mentor and mentee can only be sustained by such connectivity and mutual respect. Mutual trust, especially from the mentee, is the most important dimension of a successful mentoring relationship. "Without mentor/protégé trust no amount of structure, guidelines, and

effort can make the relationship succeed" [38]. For this to happen, the mentor and mentee need to understand and respect their different leadership and relational roles in the process. Lack of such understanding breeds conflicts that can stagnate the process. Relational mentor-leaders are transformational in the sense that they positively inspire growth and higher independent performance, resulting in desired change in a less experienced person, the mentee. In this framework, relational mentorship is a transformational leadership process.

1

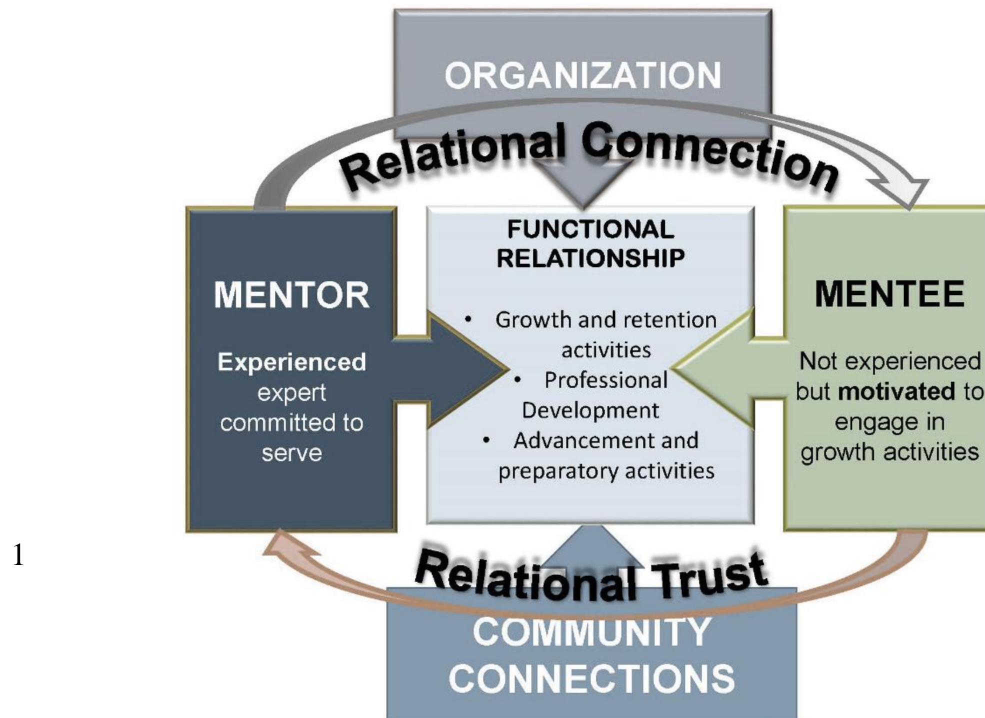

Figure 4. A trust-based implementation model of mentorship as relational followership

The four dimensions of relational mentorship—*mentee, mentor, organization, and community*— discussed above function together to be *stimulating, individualized, inspirational, and influencing* for effective functional relationship to achieve transformational mentorship through four transformational pathways: 1) mentee-mentor relationship, 2) organizational culture and climate, 3) faculty-student engagement, and 4) personal and community mindset as illustrated in Figure 3.

This conceptual framework assumes that the functionality postulated above starts at the mentor-mentee engagement, with the primary goal centered on building a functional relationship that leads the mentee to the desired success with the supports of the mentor, organization and community. Examples of the roles of mentor, organization, and community in leading the process are specified for each of the four Bass and Riggio (2008) [39] transformational leadership dimensions (*personalizing, stimulating, individualized, inspirational, and influencing)*.

Other mentorship models do exist, including: *Business Model* [40]-[42]; *One-to-one learning relationship***,** which emphasized: emotional and psychological support [43], direct assistance with career professional development, and role modeling [21], [44]-[46]; *Authentic*

*Mentorship—"*voluntary, personal relationship process between two individuals, in which one person in the relationship always is more experienced and senior in status to the second person"]47]; and *Collaborative mentorship,* a mentoring relationship designed primarily for professional development [48]. Mentors in any of the mentorship models above can generally provide both instrumental functions, such as career related advocacy, assistance, feedback, and access to networks, and psychosocial functions, such as providing help and support to a mentee [49]. The *faculty advisor as a mentor* model, used by numerous institutions to build interpersonal processes, where a group of students in a department is assigned to a faculty member (advisor), mainly for academic advising. Although some form of conversation about a student's growth path can take place, this model is not included in Figure 1 as it does not fit our classical definition of mentoring in the Relational Mentorship model proposed. I will argue that a good advisor is not necessarily a good mentor in the absence of the relational partnership in RMM.

RMM Strategies for Overcoming Relational Mentorship Barriers

In general, strategies for overcoming the identified barriers differ, depending on the context of students, faculty, and administration.

Faculty strategies for overcoming relational barriers: One of the roles of the faculty in mentorship is to help the mentee navigate the impact of systemic barriers summarized in Table 1 while also navigating the faculty barriers to relational engagement. In addition to those strategies suggested in [21] findings, faculty mentors can remove barriers to their ability and willingness to establish mentoring relationships with minority students by the following strategic actions mostly identified by 18]:

1. *Increase in multicultural competence:* by increasing one's knowledge of cultural differences, self-awareness, conflict management, interpersonal communication, feedback seeking, and role modeling
2. *Foster opportunity for relationships across race*: With the increasing diversity within the student population, the ability to establish effective relationships across race and other differences such as culture, religion, and socio-economic status make the development of multicultural competence critical for any professional's own performance and effectiveness
3. *Be aware and sensitive:* Have the knowledge of and sensitivity to the issues URM mentees face or bring in the relationship. Be aware of the day-to-day experiences of being a racial minority in a culture in which they are visibly underrepresented as well as mentors' own multicultural competence (see [50]).
4. *Be proactive to gain experience in diverse contexts and relationships:* by getting to know your students' strengths rather than their weaknesses and learning about the educational and non-academic experiences and realities of underrepresented groups
5. *Readily provide feedback to your mentee as a direct benefit of mentoring:* by challenging your URM students as you do for all others [61]
6. *Be authentic and honest in your feedback:* because students know when you are not and such an attitude can be dysfunctional; research suggests that individuals with power often avoid or give false feedback to minorities with less power [51], thus be careful not to provide emotional support in ways that negatively patronize the mentee [52]
7. *Allow evaluation of your performance as a mentor:* Periodically allow your students to evaluate the quality of the mentoring you provide and the extent to which the mentoring is provided in a way that is culturally relevant and affirming [19], [53]

8. *Evaluate quality of mentoring outcomes and extent of your guidance:* Measure the outcomes of your mentoring (the number of publications, presentations, and grants awarded) and include the extent to which you provide guidance in ways that reinforces mentees competence and legitimacy as developing scholars
9. *Aid your mentees in their career decisions:* providing them with access to professional networks and visibility, guiding them in the individual development plan, and keeping them informed and knowledgeable about what is needed to finish their degrees and land a position of the students' choice
10. *Learn to appreciate and manage racial or gender differences:* Too much focus on attraction or "best fit" related to perceived similarity between mentor and mentee [18] can create barriers to mentoring access for ethnic minority students as well as become a hurdle to fostering commitment to mentoring ethnic minority students
11. *Deal with intergroup or diversity-based anxiety and unresolved identity and cross-cultural competence issues*: Faculty mentors, especially White faculty, must seek help to deal with any element of intergroup or diversity based anxiety and the truths in mentoring [54], lack of cross-cultural competence, unresolved personal racial identity and cultural insecurity as these can create dysfunctional relationships that may negatively impact the career outcomes of minority students [55]
12. *Be reflective of your own experience:* Be willing to reflect upon your own experiences as graduate students and be open to adopt in ways in which the experiences of minority graduate students today may differ [56]
13. *Seek for intentional faculty development:* effective mentoring of all students includes providing instrumental support and advocacy [52], and requires intentional faculty development [57]; training on the stages of mentoring relationships, developing mentoring contracts, the ethical responsibilities involved in mentoring, and the benefits and costs of mentoring for both mentee and mentors themselves could serve this purpose well [57]
14. *Increase multicultural competence via training:* specifically related to conflict management, interpersonal communication, feedback seeking, and delivery and role modeling [50]

Menteeship's Strategies for Followership

Graduate students must be active participants in their education and develop personal strategies to mitigate the impact of any barriers presented in the mentoring relationships to make their graduate experience more meaningful to develop their careers:

1. *Be proactive:* To get best-desired outcome in the mentoring they desire, need, and deserve. Use an Individual Development Plan (IDP) to maximize what they need during their graduate training
2. *Research the school and plan carefully:* As noted earlier, students must research carefully in selecting the desired graduate program; some of the barriers discussed can be removed by just good research, interviewing other graduate students, visiting, and seeking out other minority students within the desired university and program
3. *Be open to diverse mentoring*: Similar to issues of culture and number of minority mentors discussed earlier, URM students need to be open to having a mentor of a different ethnic background or gender that will provide the training necessary to excel in their career goals; be open to the idea that someone who is not the same race, gender or ethnicity but believes in you and is willing to provide the training you need

4. *Become involved at their universities and communities:* by involving, integrating, and identifying with URM communities; associating with minority graduate student associations, and community involvement can positively effect minority graduate students and assist in their matriculation during graduate school [58]
5. *Seek out multiple mentors:* including mentors outside your department or field to fill the gaps in the advising and mentoring received from assigned faculty mentor or develop alternative support systems [59]; many of the African American administrators interviewed in studies of mentoring relationships [56] argued for multiple and diverse mentors
6. *Deal with oversensitivity to frequent negative stereotypes:* given the sense of being in a culture that may not be welcoming or just see you as a racial token in the department or "affirmative action" recruit, URM must develop a "thick skin" and value completion of their graduate education despite the challenge for acceptance; Some URM faculty today, including this author, would mostly agree that without self-will, determination, persistence, and a high degree of resilience to remain above the prey, they would not have completed their doctoral degrees from some of these universities.

Institutional Support to Overcoming the Barriers

The institution, college, department in which the faculty and mentee function can play a major role in supporting the faculty and students to deal with these barriers or helping to create a culture where mentoring is the of the institutional tool. Some strategies cited in Thomas *et al.* (2007) studies and others include:

1. *Transform the departmental culture and climate:* Although it is fact that URM would prefer to have mentors that share their common identity, there are not enough URM faculty in STEM fields on most college campuses to pair with the increasing number of URM students; there needs to be institutional effort to transform faculty cultures and departmental climate in ways that support cross racial and cross gender relationships
2. *Build a systemic climate for mentoring:* consider the extent to which effective mentoring, especially of minority students, is a criteria of faculty evaluations and ultimately, tenure and promotion
3. *Enhance the climate for diversity:* measure and improve the climate for diversity on campus, especially as it affects minority graduate students and faculty
4. *Promote visible institutional and departmental value for mentoring:* create support and reward mechanisms for mentoring that considers faculty contribution to student development, how many students mentored, recognition of accomplishments of students; effective recruitment, retention, mentoring and professional development of minority students
5. *Communicate the institutional receptivity for mentoring:* create university, college, and department level awards for mentoring that is visibly competitive with the level of awards given for excellence in teaching and research.

The Roles of a Transformational Mentor-Leader

Experienced hand to help mentee cross the mentorship-cultural bridge to desired success

The structure of formal mentoring in relational mentorship is achieved by interpersonal processes and interactions of values, attitudes, behaviors, ideologies, and growth. These are nurtured, constructed, and practiced by both mentor and mentee. The structure provides a process of encouraging strategic reflective thinking and communication to guide the development and growth of the mentee. As a transformational process, the primary role of a mentor in a relational mentorship process is to intellectually stimulate, motivate, and encourage strategic reflective thinking through the following actions, which incorporate recommendations by [60]: nurture interactions with mentee in ways that build meaningful trust and authentic relationship as the first foundation for the mentorship process; facilitate individualized opportunities for mentees to self-reflect or make their own decisions in problem-solving; direct and support mentees' actions by making an effort to detect problems the mentee may be going through while offering needed advice and solutions; provide a set of choices of information and resources for mentees' possible use or modification; provide ideas that enable mentees to independently solve a problem; provide encouragement and support to guide progress; intercede in the affairs of mentees as needed; and influence the correct performance character and growth attitude.

An effective mentor understands the pathway to crossing that bridge of aspired excellence and visualizes the journey much further forward than the follower can possibly see. Mentorship or relational followership then involves six-stage of interconnected mentorship: *visioning, developing/guiding, equipping, empowering,* and *achieving* desired growth experiences in followers or mentees (Wosu, 2016). In summary, the mentor envisions, develops, directs (guides and shepherds), equips, empowers, and reproduces positive growth experiences for the mentee to achieve desired success through their one-on-one relationships and relational connections. The effectiveness of relational followership is that it positively influences and impacts the mentee, resulting in the desired change toward reproducing the desired growth attitude. The mentorship or followership attribute is undertaking the combined acts of personally developing, intentionally equipping, and attentively empowering growth in others to reproduce desired growth and professional experience.

A followership process transforms and empowers followers to lead their own success and growth paths. In that context of transformation, followership is an outward attribute displayed in stages, involving some elements of transformational leadership to influence the desired growth and transformation of the self. It also allows for the newly changed self to apply brand new knowledge in one's own life and those of others. This principle means that the act of followership transforms and equips mentees to grow through four additive characteristics of transformation: Personal + Intentional + Attentive + Reproductive = Followership (Mentorship) through the influencing, individualizing, stimulating, and attentive actions of a transformational mentor-leader as shown in Figure 5.

Developing Personalized (Individualized) Engagement: A mentor does not only support the mentee to cross the bridge, he is committed to leading the mentee beyond by the bridge towards the desired goal or aspiration of the mentee by creating opportunities that lead to growth and success.

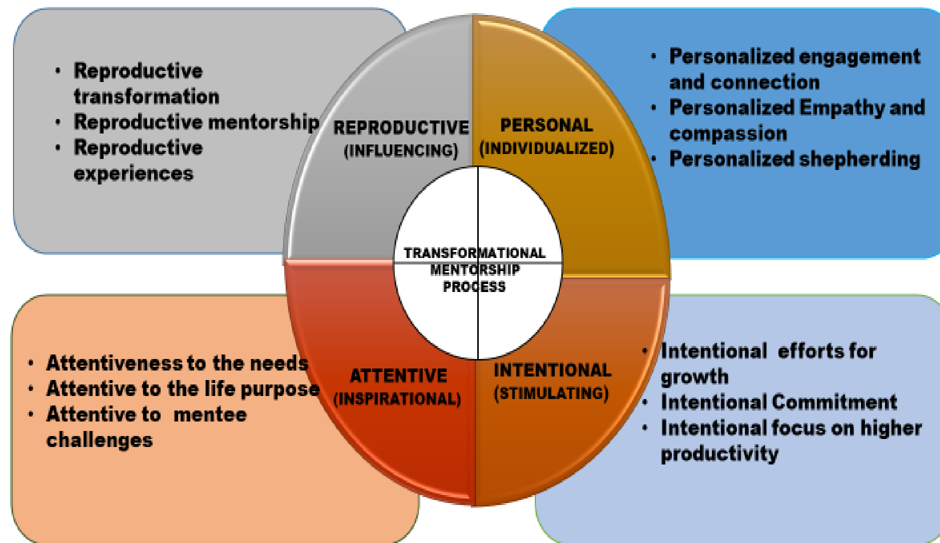

Figure 5. Characteristics of a transformational mentorship relationship [61].

Each mentee in a PhD program, for example, has an individual development plan (IDP) or goal. The process of relational followership starts with personalized interactions with the mentee involving one-on-one engagement of a mentor to inculcate a service success attitude. The acts of followership are personal actions a mentor can take to guide mentees or followers.

Show the mentee a growth pattern to follow: As the saying goes, "Experience is the best teacher." The experience becomes an even better mentor when a mentor truthfully patterns favorable examples in real time. The mentee should see the mentor displaying positive attributes, such as showing generous treatment of others, handling responsibilities, and balancing a life schedule for high productivity and ideal quality of work, etc. Mentors must be intentional in urging and inspiring students to follow a good pattern for success, and they must make the students see in them those examples that are worthy of imitation. Showing students a pattern to follow in order to model their lives might involve mentors opening themselves up for students to be free to ask questions, and mentors being ready to use every opportunity the students see as a teaching moment for growth.

Commit consistently to a mentee's growth: To sustain the growth plan, mentors must personally commit, on a daily basis, to the professional growth and welfare of their students. Anyone who has mentored someone will agree that the costs and commitments of followership are high because of the everyday requirements, the stress, and the one-on-one walk. A caring mentor is happy to extend himself to see growth in students. You must personally, not as part of a group, be involved in the welfare of your students; their interests, their suffering, and their successes. You must find time to walk with them through their challenges or celebrate with them to show that you care for their progress.

Provide emotional supports for mentee's wholeness: The emotional support a mentor gives to mentees positively impacts their relationship. Mentor-leaders influence the emotional well-being of their mentees. The purpose of helping individuals transform their service or growth attitudes is so that they can maximize their productivity. This transformation may also include influencing a change in perspective to grow in their profession. There is a power of influence in a one-on-one

personal connection because people do have challenges in their lives, most of which are very personal.

Demonstrate wholeness-compassion in challenging times: Wholeness-compassion in all of its forms is a love-based emotional response practically directed to fulfill a need that brings wholeness (completeness) to another person. Wholeness-compassion occurs when there is an intentional practical act built to alleviate the suffering (pain, grief, distress, sorrow, etc.) of another person in order to make that person complete or whole again; it is a practical emotional response rather than just emotional feelings and sympathy. The practical action may originate from emotional feelings and sympathy but must go beyond those emotions alone. Hence, the compassion that brings forth wholeness requires us to practically share in someone's brokenness, with the goal to make that person bounce back again.

Shepherd and guide mentee to grow professionally: A mentor eagerly shepherds the mentee by caring for and guiding him/her to grow professionally. Some of the characteristics of shepherding skills include love as unconditional commitment and connection, nurturing, and relational maintenance. Provide relational shepherding to focus on the goals. This is the personal act of caring for, protecting, and guiding a junior person, and remaining connected to a common purpose and the growth of that person. In the presence of challenges, for example in graduate education, it is common for a student to get distracted, lose focus on excellence, or simply not be sure of the next direction to take.

Developing Personalized and self-Followership: Mentee connects and trusts the mentor to cross the mentorship-cultural bridge together

A mentee in this context of followership can be a student, less experienced person that needs support or follower of the mentor-leader. The followership process builds a strong relationship that transforms and empowers followers (mentee, students) for their growth. Structurally, a mentored follower could also be a junior employee, student, or faculty, or just any person that needs to be guided through a journey of professional growth and good success. A good follower shadows the mentor-leader, trusts, connects, and positively responds to his or her directives. The mentee always, and with patience, morally discharges the obligated duties assigned by the mentor. This is true also for that young staff member or junior faculty member. He/She must be humble enough to follow the good example and followership of people who have gone before him. To be an effective follower, the mentee must passionately, actively, and zealously follow the transformational mentor's footsteps, bearing in mind that his footsteps may lead to challenges, but will always lead to a greater reward. Key followership actions include:

Developing Intentional (Stimulating) Followership: The act of a mentor purposefully directing and equipping the follower, often with a pre-determined success outcome. Here are some examples of intentional actions:

Intentionally providing training that prepares a mentee for the future. This means educating the mentee with good examples of experiences to equip them for independence in their present and future work. Intentionally equipping a mentee could also mean taking a conscious effort to focus on providing the mentee with needed teaching, information, and resources to reproduce the desired expectations in any setting. It means being aware and accountable for what the mentees' functional needs are for expected growth.

Intentionally focusing on the follower's productivity and success in desired life goals. Mentors need to intentionally focus on helping mentees develop effective self-leadership skills to see their growth ahead of them. Other intentional actions in followership to support a high impact on the success of mentees include: intentionally focusing on higher productivity, helping mentees adopt behavior that increases their productivity in every good work; ensuring that the mentors and organization are aware of the problems the mentees or followers face in being successful in their life goals; fostering a supportive organizational culture and environmental climate that supports mentee success; working to remove all obvious impediments to improving the learning culture, showing a commitment to success, having empathy in dealing with individual issues, having the cultural competency and sensitivity to differences, and fostering a conducive growth environment; and incentivizing excellence to encourage higher productivity.

The above actions are critically important in any organization where mentors want growth in the mentees entrusted to them by the organization. For productivity as a measure of good success, the mentor must strategically position their followers to see the journey of their growth ahead, and align their progress toward the goals with the resources, assistance, and guidance they need. Focusing on the follower's productivity also involves guarding the follower against internal and external distractions.

Developing Attentive (Inspirational) Followership: The act of giving close devotion to sustaining productive growth in someone, such as a mentee. In academic settings, attentiveness is giving students needed individualized attention, the level of which depends on their varying needs; it is important not to ignore individual needs, such as those of first-year graduate students or earlier in their program students when they are in a larger group. A mentor in these cases pays attention to ensuring that no follower suffers isolation, and especially when the group includes sub-groups which are traditionally under-represented within the group. Attentive-followership fosters an inclusive environment where all are cared for by using the following strategies:

- *Pay attention to the needs of followers and paying attention to what is going on around the mentee:* Nurturing and developing the growth of the students
- *Maximize the effective use of each follower's assets:* By knowing the innate elements of a mentee's assets (interests, strengths, abilities, talents), a mentor can determine how best to increase the development or use of mentees' acquired skills
- *Enrich the life purpose of the follower:* One question to ask a follower is what will best meet his/her purpose in life
- *Equip the follower for independence:* Ultimately, the mentee will be released to be independent of the mentor through an attentive nurturing of self-leadership skills for growth; great mentor-leaders challenge their students as a method of empowering them; there is always a higher purpose
- *Share and expend yourself with those in need:* Expending yourself as a way of sharing with those in need is an important part of the relational compassion attribute; mentorship is typically mentee-centered, and mentors are generally generous with their time in intentionally sharing thoughts, words, deeds, and emotions

Reproductive-Followership: Relational followership reproduces growth and successful self-leadership skills in the mentees, whereby they emulate the success principles and values of the mentor. Reproductive followership is concerned with building those relationships and

relational attributes, such as emulation, empathy, hard work, diligence, and affection that reproduces self-leadership qualities in the mentee. It is fostering the environmental climate or conditions whereby the follower can learn from the mentor through their relationship with each other. Strategies for mentoring in different settings are well documented in the literature of academia, athletics, churches, corporations (profit and nonprofit), the military, and many other areas. Here are a few examples:

- *Develop the acts of mentor-leadership* by focusing on developing the strengths of individuals by building specific skills; making the mentee better in what they (the mentees) do, whether they are students, players, workers, etc.; making the mentee aware that the mentor has a genuine interest in his or her development
- *Guide your mentee to discover personal purposes:* A great mentor uses a type of mentor-guided, inquiry-based, discovery learning method that typically involves a four-stage process (Lee, 2013); inspiring learners, guiding inquiry with intriguing questions, allowing learners to explore hypotheses, and encouraging application of what has been learned
- *Create opportunities for personal discovery:* Information a follower discovers about him- or herself adds more value to the follower's knowledge, for example, if one discovers that he or she can lead a small group to accomplish a goal, it will motivate the person to want to engage in activities that create an opportunity for developing more skills in that area; creating opportunities to discover more truth about themselves means that the mentor needs to know the personal purposes of their students

Summary and Conclusion

The mentorship cultural bridge was introduced within the framework of *Relational Mentorship Model (RMM*). Strategies for breaking barriers for mentors, mentees, and organizations were presented in the context of increasing the success of engineering doctoral students, especially those from under-represented groups in research intensive settings. Strategies for developing effective mentoring relationships for the general growth of the mentee were also presented. The paper showed in different discussions that relational mentorship can be transformational in positively inspiring growth and higher independent performance skills on a mentee toward desired success. Mutual trust and connectivity were shown to be critical support that enable both mentor and mentee to jointly cross the mentorship cultural bridge in a transformational mentorship process.

In the several years of adopting the RMM activities in three institutions, and in several education programs that support URM graduate and undergraduate students, the model has proven to be effective, not only in raising quality of URM undergraduate students (from 30% before RMM to over 58% with of GPA above 3.0), retention and graduation of URM PhD students in the PITT STRIVE program. For example, retention is over 89% better than majority students, and with other changes in the graduate culture, impacted PhD graduations from five in the six-year period before STRIVE to 22 over six year period of the STRIVE program.

The proposed RMM involves time-intensive monthly one-on-one mentorship meeting outside of the regular lab research activities, requiring mentor's make a personalized 30-45 monthly meeting commitment to the success of relationship and progress of the doctoral mentee. In adopting this model and for maximum impact, mentor's personalized-engagement and mentee's self-followership are strongly recommended to allow for intentional, structured connection and trusts to cross the mentorship-cultural bridge as a joint effort. The mentor and mentee basic training in mentorship and menteeship are recommended; mentors must be willing and committed to the growth and development

of a mentee, promoting excellence, while fostering the mentee's willingness and ability to follow a path of academic achievement. To be transformational, it is further recommended that the mentor-leader be willing to intellectually stimulate mentee, showing empathy in challenging times and be able to commit to a proper amount of time to support the mentee's growth. To be an effective mentee-follower, the mentee must passionately, actively, and zealously follow the transformational mentor's footsteps, bearing in mind that his or her footsteps may lead to challenges, but will always lead to a greater reward.

For further research, there is lack of data in leadership and organizational receptivity to mentorship and the impact of disruptions, such as the virtual engagement during Covid 19 pandemic on mentee-mentor relationship. Structured mentorship and DEI service work that yield results in advancing URM students is time intensive and yet receive minimum recognition in research I institutions. The question remains: How can receptivity and leadership support in DEI and mentorship be framed to incentivize the mentorship engagement and improve the breaking of the identified systemic barriers? Further research is also needed in the testing of the RMM model for URM and non-URM and the broadened evaluation to better understand the level of effectiveness of this model in different academic fields. A key question to explore is how the three levels of culture and climate in Figure 3 intercept to maximize the impact of mentorship on mentor and mentee, and on the organization in which they function.

References

[1] K. ***Maton, S.*** Pollard**, T.** McDougall Weise**, and F.** Hrabowski ***(2012) "***Meyerhoff Scholars Program: a strengths-based, institution-wide approach to increasing diversity in science, technology, engineering, and mathematics," *Mt Sinai J Med*, 79(5):610-23. **doi: 10.1002/msj.21341.**

[2] T. Figueroa and S. Hurtado, (2013). "Running Head: URM GRAD STUDENTS IN STEM Underrepresented Racial and/or Ethnic Minority (URM) Graduate Students in STEM Disciplines: A Critical Approach to Understanding Graduate School Experiences and Obstacles to Degree Progression," *Association for the Study of Higher Education November 2013,* St. Louis, Missour

[3] A. Flynn, B. Sanchez, & G. Harper, (2011). « An ecological analysis of research examining the experiences of underrepresented racial and/or ethnic minority in graduate school." *Journal of Diversity in Higher Education.* Advance online publication. doi: 10.1037/a0021506

[4] S. Gardner, (2010). "Contrasting the socialization experiences of doctoral students in high- and low-completing departments: A qualitative analysis of disciplinary contexts at one institution." *The Journal of Higher Education, 81*(1), 61-81.

[5] J. Gonzalez, (2006). "Academic socialization experiences of Latina doctoral students: A qualitative understanding of support systems that aid and challenges that hinder the process." *Journal of Hispanic Higher Education, 5*(4), 347–365.

[6] G. López, (2003). "The (racially neutral) politics of education: A critical race theory perspective." *Educational Administration Quarterly, 39*(1), 68-94.

[7] M. Omi and H. Winant (2014). *Racial Formation In The United States*, 3rd Ed, Published July 1, By Routledge

[8] C. Justin-Johnson (2004). “Good fit or chilly climate: An exploration of the persistence experiences of African-American women graduates of predominantly White college s cience programs.” Unpublished doctoral dissertation, University of New Orleans.

[9] D. Sinex, M. Besterfield-Sacre, W. Carter-Veale, D. Yohe, Drew; S. Abramowitch, and S. ; Wosu, (2020). “The Pitt Strive Program: Adopting Evidence-Based Principles "The Meyerhoff And Promise Way”.. *ASEE Annual Conference. Virtual*

[10] K. Abrams, (1993). “Gender in the military: Androcentrism and institutional reform.” *Law & Contemporary Problems, 56*(4), 217-241.

[11] S. Brennan, (2013). “Rethinking the moral significance of micro-inequities: The case of women in philosophy.” *In F. Jenkins & K. Hutchison (Eds.), Women in Philosophy: What Needs to Change?* Oxford University Press.

[12] M. Nettles, (1990). “Success in doctoral programs: Experiences of minority and white students.” *American Journal of Education*, 494 - 522.

[13] A. Wylie, J. Jakobsen, & G. Fosado, G. (2007). *Women, work and the academy.* New York: Barnard Centre for Research on Women.

[14] M. Rowe,(2008). “Micro-affirmations and micro-inequities.” *Journal of the International Ombudsman Association, 1,* 45-48.

[15] B. Sandler, (1986). *The campus climate revisited: Chilly for women faculty, administrators, and graduate students.* Washington: Association of American Colleges.

[16] S. Brennan, (2013). “Rethinking the moral significance of micro-inequities: The case of women in philosophy.” *In F. Jenkins & K. Hutchison (Eds.), Women in Philosophy: What Needs to Change?* Oxford University Press.

[17] U. Jayakumar, T. Howard, W. Allen, and J. Han (2009). “Racial privilege in the professoriate:An exploration of campus climate, retention, and satisfaction.” *Journal of Higher Education* 80 (5):538–563

[18] KM.Thomas, K.M, Willis, A. Leigh, and Davis, J. “Mentoring minority graduate students: issues and strategies for institutions, faculty, and students.”*Equal Opportunities International*, Vol. 26 No. 3, 2007 pp. 178-192

[19] J.E.Girves, Y. Zepeda, and J.K. Gwathmey, ‘‘Mentoring in a post-affirmative actionworld,’’ *Journal of Social Issues*, Vol. 61 No. 3, 2005,pp.449-80

[20] S.N. Wosu, S. Abramowitch**,** and D. Gau**.** “Early Lessons in Changing Engineering Culture for the Success of URM Doctoral Students in Engineering: PITT STRIVE.” February 2019, DOI: **10.1109/ISECon.2019.8882024**, Conference: 2019, 9th IEEE Integrated STEM Education Conference (ISEC), Princeton New Jersey

[21] J. Rinehart, S. Metz, & N. Ostrovskaya, “Mentoring Men of Color and Women to Faculty Positions: Results from a Faculty Survey.” *Proceedings of 2003 American Society for Engineering Education (ASEE) Annual Conference & Exposition American*

[22] B. Laura and R. J. Sternberg, *Psychological Interventions in Times of Crisis*, Springer Publishing Company, 2006

[23] G.T. Chao, P.M. Waltz, & P.D. Gardner, “Formal and informal mentorships: A comparisonof mentoring functions and contrast with nonmentored counterparts.

Personnel Psychology, 45, 1992, pp. 316-319.

[24] L.J. Zachary, *The mentor's guide: Facilitating effective learning relationships*. San Francisco: Jossey-Bass, 2000

[25] G.L. Rose, “Group differences in graduate students’ concepts of the ideal mentor,” *Research in Higher Education*, 2005, 46(1), pp. 53-80.

[26] L.L.Crumpton-Young, “Mentoring practices proven to broaden participation in STEM disciplines,” *121st ASEE Annual Conference & Exposition,* June 15-18, 2014.

27] S. Wosu, *Leader-as-Servant Leadership Model : An Integrative Transformative Leadership Model*, 2014, Xulon Press Publishing , 460pp

[28] C. A. Stanley & Y.S. Lincoln, “Cross-race faculty mentoring”. Retrieved May 20, 2016 http://eric.ed.gov/?id=EJ711665.

[29] E. Schein, *Organizational Culture and Leadership*, 4th edition, 2010,Jossey-Bass, A Wisely Imprint, San Fransisco, CA

[30] L.J. Zachary, “How to create a mentoring culture: Hallmarks of a mentoring Culture,Retrieved from: http://humanresources.about.com/od/coach ingmentoring/a/mentor_culture.htm.

[31] J.E. Zins, M. R. Bloodworth, R. P. Weissberg & H. J. Walberg, “The Scientific Base Linking Social and Emotional Learning to School Success, Journal of Educational and Psychological Consultation, 2007, **17:2-3,** ***191-210,*** **DOI: 10.1080/10474410701413145**

[32] **D. Narvaez**,”The Emotional Foundations Of High Moral Intelligence” **17 September 2010,** https://doi.org/10.1002/cd.276, Retrieved July 2016

[33] B. Murray, ‘‘Unique mentor programs bolster students’ careers’’, APA Monitor, Vol. 50, May, 1997, pp. 50.

[34] J.M. Sanders, and H.Y. Wong, ‘‘Graduate training and initial job placement’’, Sociological Inquiry, 1985,Vol. 55, pp. 154-69.

[35] R.J. Burke, “Mentors in organizations, Group and Organizational Studies,1984,Vol.9,pp.353-72.

[36]. F.A. Fagenson, ‘‘The mentor advantage: perceived career/job experiences of proteges versus non-proteges,’’ *Journal of Organizational Behavior*, 1989, Vol. 10, pp. 309-20.

[37 J.B. Wilde, and C.G. Schau, ‘‘Mentoring in graduate schools of education: Mentee’s perceptions’’, Journal of Experimental Education, 1991, Vol. 59, pp. 165-79.

[38] J. Williams, “Mentoring for law enforcement.” *FBI Law Enforcement Bulletin*, 2000, 69(3), pp. 19-25.

[39] B.M. Bass, & R.E. Riggio, *Transformational leadership*. Mahwah, New Jersey: 2008, Lawrence Erlbaum Associates, Inc.

[40] M.G. Zey, “The mentor connection: Strategic Alliances in corporate life.” 1991, New Brunswick, NJ: Transaction.

[41] S.J. O’Dell, “Mentor teachers program.”. Washington, D.C.: National Educational

Association

[42] M. Bryant-Shanklin, & N.W. Brumage, "Collaborative responsive education mentoring: Mentoring for professional development in higher education." *Florida Journal of Educational Administration & Policy*, 2011, 5(1). 17(1), pp. 1-4. }

[43] M. Jacobi, M. "Mentoring and undergraduate academic success: A literature review,". *Review of Educational Research, 1991,61*(4), pp. 505–532

[44] J.O. Santamaria, "Mentoring develops high-potential employees. Asia Africa Intelligence Wire. Sciences," *Journal of Chemical Education, 2003,* . 82:15 16.

[45] D.F. Zellers, "Developing an organizational understanding of faculty mentoring programs in academic medicine in major American research universities," PhD Dissertation, University of Pittsburgh ;

[46] J. Johnson-Bailey & R.M. Cervero, "Mentoring in black and white: The intricacies of Cross-cultural mentoring". *Mentoring and Tutoring*, 2004, *12*(1), pp. 7–21.

[47] O.L Davis, "Editorial: A view of authentic mentorship,". *Journal of Curriculum and Supervision, 2001*

[48] M. C. Ayar **and B.** Yalvac **"**Lessons Learned: Authenticity, Interdisciplinarity, and mentoring for stem learning environments**,"** 2016, International Journal of Education in Mathematics Science and Technology **4(1):30 DOI:**10.18404/ijemst.78411

[49] K.M. Thomas, C.Y. Hu, C.Y., A.G. Gewin, K.L. Bingham, K.L. and N. Yanchus, ''The roles of prote´ge´ race, gender, and proactive socialization attempts on peer mentoring'', Advances in Human Resource Development, 2005, Vol. 7 No. 1, pp. 540-55.

[50] D. Chrobot-Mason and M. Ruderman,, ''Leadership in a diverse workplace'', in Stockdale, M. and Crosby, F. (Eds), *The Psychology and Management of Workplace Diversity*, 2004, Blackwell, Malden, MA, pp.100-21.

[51] T.J. Cox, *Cultural Diversity in Organizations: Theory, Research, and Practice*, Berrett Koehler, 1994, San Francisco

[52] E.K. Enomoto, M. E. Gardiner, and M. Grogan, ''Notes to Athene: mentoring relationships for women of color'', Urban Education, 2000,Vol.35 No. 5, pp.567-83

[53] H. Ellis,''Graduate education in Psychology: past, present, and future'', American Psychologist, 1992, Vol. 47 No. 4,pp.570-6.

[54] D.A. Thomas, "The truth about mentoring minorities: Race Matters." 2001, Harvard Business.

[55] D.L. Chrobot-Mason and K.M. Thomas, ''Minority employees in majority organizations: the intersection of individual and organizational racial identity in the workplace'', Human Resource Development Review, 2002,Vol. 1 No.3, pp.323-44

[56] S.N. Wosu, *Leader as servant leadership model*. 2014, Xulon Press, FL.

[57] W.B. Johnson & J.M. Huwe, "Getting Mentored In Graduate School." American Psychological Association, 2003

[58] M.C. Brown and G.L. Davis, and S.A. McClendon, ‘‘Mentoring graduate students of color: myths, models, and modes’’, Peabody Journal of Education,1999, Vol. 74 No.2, pp.105-18.

[59] E. Ellis, ‘‘Race, gender, and the graduate student experience: recent research’’, Diversity Digest, Fall, available at: www.diversityweb.org/Digest/F00/graduate.html (accessed 19 February 20020)

[60] T.M. Wildman, S.G. Magliaro, R.A. Niles, & J.A. Niles, « Teacher mentoring: An analysis of roles, activities, and conditions.” 1992, *Journal Of Teacher Education,* 4 (3), pp. 205-213.

[61] S.N. Wos**u,** *Relational Mentorship in Higher Education: A Mentoring Coaching Guide for Student and Faculty Success*, *420**pp,*** 2016, KLI Publishing