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Integrated Peer and Reverse Mentoring: Fostering Wellbeing in Engineering Education

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This paper explores an integrated peer and reverse mentoring program implemented for undergraduate engineering students at a Hispanic-Serving Institution. The integrated mentoring program promotes both individual and organizational wellbeing by building developmental networks across student-faculty boundaries. This mentoring approach redefines traditional mentoring by fostering reciprocal learning, developing student leadership competencies, and strengthening faculty-student engagement, directly addressing the need for more inclusive and adaptive mentoring structures within STEM education. The program is grounded in developmental network theory and draws upon constructs of reciprocal mentoring, student-centered pedagogy, and sense of belonging frameworks. This intervention engages near-peer mentors, upper-level students with leadership experience who meet weekly with first-year students and bi-weekly with faculty to share insights on curriculum and student life. The integrated mentoring program aligns with socio-cultural theories of learning, emphasizing the co-construction of knowledge and identity through shared experiences and feedback. The program promotes wellbeing by integrating psychosocial, emotional, and professional development components with mentoring relationships serving as conduits for institutional adaptation, community building, and holistic support for both mentees and mentors. Data collection includes surveys, reflective journals, and focus groups with students, mentors, and faculty. A mixed-methods approach assesses engagement, academic confidence, and reverse mentoring value. Faculty reflections and curriculum adjustments are documented to evaluate how the mentoring model influences institutional practices and supports broader educational goals. Preliminary results show increased student belonging, communication, and leadership confidence. Mentors gained facilitation experience while faculty reported greater awareness of student needs, informing their teaching philosophy and curriculum design. The integrated mentoring program demonstrated strong potential for sustainable mentoring reform by bridging generational gaps and fostering inclusive engineering education cultures. Findings underscore the value of developmental networks in promoting wellbeing, improving academic performance, and enhancing institutional responsiveness, particularly in diverse and underrepresented settings committed to student-centered growth and equity.

Keywords: Engineering education, peer mentoring, reverse mentoring, student wellbeing, leadership development

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Introduction

The increasing complexity of higher education environments, especially in STEM fields, demands holistic approaches to mentoring that prioritize not only academic achievement but also support the emotional, psychosocial, and professional wellbeing of students (Pucciarelli & Kaplan, 2016). Students engaged in STEM coursework are likely to experience stressors of anxiety, burnout, and impaired psychological wellbeing as STEM fields are often viewed as highly demanding work environments (Portz, S, 2015; Wai et al., 2010). This need is particularly acute at Hispanic-Serving Institutions (HSIs), where students often navigate systemic barriers while balancing academic, cultural, and personal responsibilities (Rodriguez & Gonzales, 2020). Developmental networks that include peer and reverse mentoring models provide critical structures for supporting these multidimensional student experiences.

This paper reports the experiences and results from implementing an integrated mentoring program designed for first-year engineering students at a large HSI. This approach fosters reciprocal, developmental relationships among

mentees, near-peer mentors, and faculty/staff mentors. The initiative incorporated two key pillars: (1) a series of creative mental health and art therapy workshops designed to enhance self-awareness, stress regulation, and identity development among mentors, and (2) targeted professional development training that equipped mentors with skills necessary for graduate school and career readiness. By weaving these elements into the mentoring ecosystem, the program directly addressed multiple dimensions of wellbeing—psychosocial, emotional, identity-based, and professional—while also enhancing organizational culture and performance through reverse mentoring.

Literature Review

The role of mentoring in higher education has evolved from a one-directional transmission of knowledge to a dynamic and reciprocal relationship that fosters the growth of both mentors and mentees (Crisp & Cruz, 2009). Recent scholarship emphasizes the importance of developmental networks—webs of relationships that collectively provide career guidance, psychosocial support, identity affirmation, and learning opportunities (Dobrow et al., 2012; Higgins & Kram, 2001). Within this framework, peer and near-peer mentoring models have emerged as critical tools to support student success, especially in STEM and historically underrepresented student populations (Dennehy & Dasgupta, 2017; Garcia et al., 2019; Smith et al., 2020).

Wellbeing, including emotional, psychosocial, and professional dimensions, has become a key concern in mentoring scholarship, particularly in the wake of global disruptions such as the COVID-19 pandemic, systemic racial inequities, and rising mental health challenges among college students (Gallup, 2023; NASPA, 2020). Researchers argue that effective mentoring programs must attend to the whole person, not only addressing academic achievement but also fostering identity development, emotional regulation, and a sense of belonging (Budge, 2006; Nora & Crisp, 2007).

Creative practices such as art therapy have shown promise as interventions to support mental health and identity exploration in educational settings (Chilton & Leavy, 2014; Malchiodi, 2012). Activities like mask-making and acrylic pour painting allow participants to externalize internal experiences, process complex emotions, and engage in reflective self-expression (Kapitan, 2010). When incorporated into mentoring programs, these modalities can enhance mentors' capacity for empathy, emotional resilience, and connection-building, critical traits for effective leadership and support (Lewis et al., 2016). Similarly, hands-on wellness activities like DNA necklace creation and slime therapy combine scientific curiosity with mindfulness and stress relief. These strategies echo the principles of experiential learning and social-emotional development, underscoring the role of creativity in fostering wellbeing within STEM environments (Davis, 2018).

Professional development opportunities embedded within mentoring practices can prepare students for long-term academic and career success. Workshops on resume writing, letters of recommendation, and graduate school navigation reduce barriers to postgraduate opportunities and ultimately support upward mobility (Posselt et al., 2020). These experiences also enhance mentors' self-efficacy and perceived preparedness, reinforcing a sense of direction and purpose.

Finally, reverse mentoring, where younger or less experienced individuals share insights with more senior faculty or administrators, has been shown to foster organizational learning and transformation (Clutterbuck, 2014; Murphy, 2012). This model empowers students to influence institutional practices while validating their lived experiences—an especially powerful dynamic at Hispanic-Serving Institutions, where mentorship can serve as a lever for equity and culturally responsive pedagogy (Garcia, 2019; Yosso, 2005).

Together, this body of literature supports a growing consensus that mentoring is most effective when it is embedded within developmental networks to promote holistic wellbeing, reciprocal learning, and long-term growth for individuals and institutions alike. The present study builds upon this foundation by examining how a multifaceted mentoring model—infused with art therapy, mental health support, and professional training—can enhance student outcomes and transform the mentoring culture within a first-year engineering program at an HSI.

Program

The integrated mentoring program was implemented in a first-year engineering course at an HSI and involved three core groups: first-year engineering students (mentees), undergraduate teaching assistants (near-peer mentors), and graduate students and senior staff (senior mentors). The mentoring structure was designed to support both academic success and holistic wellbeing through layered, reciprocal, and developmentally focused relationships. The key components of the integrated mentoring program are described next.

Methodology

Senior mentors met bi-weekly with near-peer mentors who, in turn, met with mentees 3 times per week. All sessions were held during a standard 16-week semester. Post-surveys were completed by mentees and near-peers to gain qualitative insights into areas for skill improvement and are discussed in the Results section of this paper.

Biweekly Faculty and Senior Mentor Coordination

The faculty involved in the mentoring initiative held biweekly meetings with senior mentors to review student progress, mentor development, and reverse mentoring feedback. These touchpoints

ensured consistency across mentoring practices and allowed the instructional team to make real-time, student-informed adjustments to both course delivery and mentoring approaches.

Weekly Near-Peer Coordination

Near-peer mentors (mentors) provided mentees with personalized mentorship in conjunction with in-class instruction. Faculty facilitated classroom instruction, and near-peer monitored and assisted with assignments and online course content. Mentors attended class sessions to answer questions, provide course project guidance, and offer insight that would help mentees succeed in the course and their engineering journey.

Pre-Semester Training and Orientation

Before the semester began, mentors completed a multi-day training series led by faculty and senior mentors. The training covered inclusive pedagogy, culturally responsive teaching, conflict navigation, and developmental mentoring strategies. Mentors were also introduced to the course curriculum to align academic content with mentoring support.

Mentoring Engagement

Near-peer mentorship with mentees focused on prioritizing student wellbeing, identifying how to help students both learn and succeed, and implementing leadership best practices to create a healthy, balanced engineering space. Mentors met weekly with faculty and senior mentors to co-design responsive strategies based on mentee feedback and performance. These sessions created a feedback loop, allowing reverse mentoring insights from students to shape course delivery and engagement practices directly. Mentors also used these sessions for reflective journaling, scenario analysis, and role-playing activities to prepare for diverse student interactions. Mentors also received mental-health and art therapy workshops, as well as professional development workshops provided by faculty and senior mentors.

Mental Health and Art Therapy Workshops

Recognizing the importance of psychosocial wellbeing in mentoring effectiveness, the program incorporated creative and therapeutic workshops tailored for the mentors, as seen in Figure 1 below. Facilitated by senior mentors trained in student wellbeing, these sessions offered mentors stress relief, emotional regulation tools, and community-building experiences.

These activities were grounded in principles of art therapy and somatic regulation, which provided mentors with tools to manage their wellbeing while supporting their mentees. The use of creativity, symbolism, and tactile engagement promoted emotional literacy and self-care awareness.

Figure 1

Mental Health and Art Therapy Workshops

a) Acrylic Pour Painting

b) Mask-Making for Self-Expression

c) DNA Necklace Creation

d) Slime Therapy and Sensory Play

Professional Development Workshops

To support near-peer mentors in their career trajectories, the program offered a series of professional development sessions designed to prepare them for graduate school and the workforce. The professional development workshops covered topics including:

- Resume and CV development
- Writing letters of recommendation and requesting them effectively
- Interview skills and mock interviews
- Personal statements and graduate school application strategies
- Time and task management for academic success

By embedding these workshops into the mentoring program, mentors experienced tangible growth in confidence and preparedness for their future careers. They also gained experience articulating their leadership and mentoring skills in professional contexts.

Results

Mentees Outcomes

Likert scale surveys revealed strong satisfaction and notable skill development. Mentees were asked to indicate the quality of mentoring received during the introductory engineering course. Over 90% of students rated mentoring quality as very good or excellent. Mentees were also asked to indicate their level of agreement with specific mentoring abilities of the peer mentors. Mentees indicated that peer mentors were extremely skilled at acknowledging the mentees' successes, employing strategies to enhance the mentees' academic knowledge and skills, and helping mentees develop strategies to meet their academic and professional goals.

In addition, the mentees stated that peer mentors helped them grow in the following areas:

- 31% increase in team and faculty communication confidence
- 38% increase in time management confidence
- 34% and 32% improvement in financial management and savings, respectively
- 55% increase in classroom participation confidence
- 37% increase in sense of belonging and connection to their institution.

Near-peer Mentor Development

Mentors also participated in a Likert scale survey to reflect on their growth as mentors. They shared that their participation in the integrated mentoring program helped them grow their communication and leadership skills. Mentors directly applied the knowledge gained from the mental-health and art therapy, as well as professional development workshops with senior mentors, to develop their mentorship style. Survey results identified gains in public speaking, time management, and organizational abilities, highlighting the mentoring program's reciprocal learning structure. Moreover, the peer mentors' survey results revealed:

- 50% increase in active listening skills
- 31% improvement in navigating sensitive conversations
- 28-71% gains in mentoring techniques (aligning expectations, feedback, and adaptability)

Senior Mentors and Faculty Observations

Senior mentors and faculty observed a notable growth in the mentors' confidence and overall attitudes and development throughout the semester. During casual, unstructured time, senior mentors observed an increase in mentors' confidence and motivation to exercise social and professional skills. Mentors expressed interest in getting involved with their peers, via student organizations, and actively engaged in conversations with one another, utilizing on-campus resources and shared spaces to study, work, or take breaks between classes. Motivation to participate in academic or professional opportunities, such as conferences, increased. Furthermore, mentors sought out senior mentors to engage in casual conversations regarding academic, professional, and personal experiences.

Discussion

The integration of art therapy and mental health practices into the integrated mentoring program proved to be a powerful strategy for promoting holistic wellbeing. Workshops such as acrylic pour painting, slime therapy, DNA necklace crafting, and mask-making offered mentors more than just moments of creative reprieve; they served as catalysts for emotional expression, identity exploration, and team cohesion. These activities aligned with principles of trauma-informed and asset-based pedagogy, offering mentors a safe space to reflect on their experiences, manage stress, and build self-efficacy.

The four workshops were designed to support peer mentors in the following aspects:

- Acrylic Pour Painting: Mentors explored fluidity and emotional release through abstract art.
- Mask-Making for Self-Expression: Mentors reflected on their identities and the personas they bring to academic spaces.
- DNA Necklace Creation: Mentors reinforced individuality and purpose by combining science and self-discovery.
- Slime Therapy and Sensory Play: Mentors experienced a calming, hands-on activity to support mindfulness and reduce anxiety.

By experiencing these forms of wellness-centered engagement, mentors were better equipped to support their mentees, not just academically, but also emotionally and socially. This reciprocal benefit reflects the conference's guiding question: How does mentoring promote wellbeing for both mentees and mentors? The data collected through reflective mentor journals and focus group discussions revealed that mentors

felt increased confidence, decreased burnout, and a stronger sense of belonging within the institutional community.

The professional development component reinforced this trajectory by bridging mentors' personal growth with future aspirations. Workshops on resumes, recommendation letters, and graduate school preparation allowed mentors to articulate their experiences in ways that demonstrated leadership, resilience, and emotional intelligence. Several mentors reported that participation in these workshops helped them secure internships, research opportunities, or clarify their career paths.

Moreover, the reverse mentoring dynamic—wherein near-peer mentors shared feedback with faculty to improve course design—helped transform the broader educational environment. Faculty members and senior mentors gained new insights into the lived experiences and needs of students, making instruction more relevant, compassionate, and effective. Likewise, these seasoned mentors paired their established mentorship skillsets alongside observed mentor behavior to personalize their approach to the needs of each student. This shift toward a more inclusive and responsive academic culture illustrates how developmental networks can spark institutional learning and change.

Conclusion

The integrated mentoring initiative described in this paper illustrates the transformative potential of developmental networks grounded in wellbeing. What makes this approach unique is its dual focus on fostering individual student success and creating a community of practice that advances both emotional wellbeing and professional growth. By centering the emotional, psychosocial, and professional needs of near-peer mentors, the program modeled a mentoring ecosystem where wellbeing was not an add-on, but a foundational element of leadership development and academic success.

The inclusion of mental health and art therapy workshops supported mentors in regulating their emotions, exploring their identities, and building meaningful connections with their peers. Before the incorporation of these workshops, mentors would voice daily frustrations without resolution, whereas after these workshops, frustration levels dissipated, and the mentors were better equipped to handle emotional challenges. In turn, this wellbeing-centered approach enhanced their ability to mentor first-year students with empathy and confidence. Simultaneously, professional development workshops expanded mentors' access to future opportunities and helped solidify the mentoring experience as a career-boosting endeavor.

This dual emphasis on wellbeing and preparation for the future underscores the potential for developmental networks to address not only individual student growth but also broader organizational transformation. At a time when institutions are being called to reimagine how they support the whole student, this model offers evidence that investing in the reciprocal wellbeing of mentors and mentees is not just beneficial but essential.

As institutions consider sustainable strategies to promote equity, wellbeing, and success, this initiative demonstrates how structured, creative, and responsive mentoring practices can yield high-impact results for students, mentors, faculty, and the institution.

References

Budge, S. (2006). Peer mentoring in postsecondary education: Implications for research and practice. *Journal of College Reading and Learning, 37*(1), 71–85. https://doi.org/10.1080/10790195.2006.10850194

Chilton, G., & Leavy, P. (2014). Arts-based research practice: Merging social research and the creative arts. In P. Leavy (Ed.), *The Oxford handbook of qualitative research* (pp. 403–422). Oxford University Press.

Clutterbuck, D. (2014). *Everyone needs a mentor: Fostering talent in your organisation* (5th ed.). CIPD.

Crisp, G., & Cruz, I. (2009). Mentoring college students: A critical review of the literature between 1990 and 2007. *Research in Higher Education, 50*(6), 525–545. https://doi.org/10.1007/s11162-009-9130-2

Davis, H. A. (2018). *Promoting social-emotional competence in children: A practitioner's guide to evidence-based programs.* Routledge.

Dennehy, T. C., & Dasgupta, N. (2017). Female peer mentors early in college increase women's positive academic experiences and retention in engineering. *Proceedings of the National Academy of Sciences, 114*(23), 5964–5969. https://doi.org/10.1073/pnas.1613117114

Dobrow, S. R., Chandler, D. E., Murphy, W. M., & Kram, K. E. (2012). A review of developmental networks: Incorporating a mutuality perspective. *Journal of Management, 38*(1), 210–242. https://doi.org/10.1177/0149206311415858

Gallup. (2023). *State of the Global Workplace 2023 Report*. Gallup, Inc. https://www.gallup.com/workplace/349484/state-of-the-global-workplace.aspx

Garcia, G. A. (2019). *Becoming Hispanic-serving institutions: Opportunities for colleges and universities*. Johns Hopkins University Press.

Garcia, R., Johnson, M., & Williams, A. (2019). Reciprocal mentoring in STEM: A case study

of a near-peer mentoring program for undergraduate women. *Journal of Women and Minorities in Science and Engineering, 25*(1), 65–82.

Higgins, M. C., & Kram, K. E. (2001). Reconceptualizing mentoring at work: A developmental network perspective. *Academy of Management Review, 26*(2), 264–288. https://doi.org/10.5465/amr.2001.4378023

Kapitan, L. (2010). *Introduction to art therapy research*. Routledge.

Lewis, C., Holman, A., & Nagel, D. A. (2016). The lived experience of art therapy for women with anxiety: A phenomenological study. *The Arts in Psychotherapy, 49*, 55–62. https://doi.org/10.1016/j.aip.2016.05.010

Malchiodi, C. A. (2012). *Handbook of art therapy* (2nd ed.). Guilford Press.

Murphy, W. M. (2012). Reverse mentoring at work: Fostering cross-generational learning and developing millennial leaders. *Human Resource Management, 51*(4), 549–573. https://doi.org/10.1002/hrm.21489

NASPA. (2020). Well-being and success in college: New insights from the Gallup and Lumina Foundation study. NASPA—Student Affairs Administrators in Higher Education. https://www.naspa.org

Nora, A., & Crisp, G. (2007). Mentoring students: Conceptualizing and validating the multi-dimensions of a support system. *Journal of College Student Retention: Research, Theory & Practice, 9*(3), 337–356. https://doi.org/10.2190/CS.9.3.e

Posselt, J., Reyes, K. A., Slay, K., Kamimura, A., & Porter, K. B. (2020). Equity-minded organizational change: Selecting organizational routines to disrupt racial and gender inequality in graduate education. *The Journal of Higher Education, 91*(3), 339–364. https://doi.org/10.1080/00221546.2019.1664196

Pucciarelli, F., & Kaplan, A. (2016). Competition and strategy in higher education: Managing complexity and uncertainty. *Business Horizons, 59*(3), 311-320

Portz S. (2015). *The challenges of STEM education. The space congress proceedings. 3*. https://commons.erau.edu/space-congress-proceedings/proceedings-2015-43rd/ proceedings-2015-43rd/3

Rodriguez, P. J., & Gonzales, R. M. (2020). Mentorship and cultural belonging for firstgeneration and transfer students at an HSI in South Texas. Hispanic Serving Institutions(HSIs) in Practice: Defining "Servingness" at HSIs, 295-312.

Smith J., Stevens M., & Davidson, M. (2020). Dual mentoring as a mechanism for enhancing clinical skills development. *Nurse Education Today, 84*, 104, 236.

Wai J., Lubinski D., Benbow C.P., Steiger J.H. (2010). Accomplishment in science, technology, engineering, and mathematics (STEM) and its relation to STEM educational dose: A 25-year longitudinal study. *Journal Education Psychology, 102*, 860–871. doi: 10.1037/a0019454.

Yosso, T. J. (2005). Whose culture has capital? A critical race theory discussion of community cultural wealth. *Race, Ethnicity, and Education, 8*(1), 69–91. https://doi.org/10.1080/1361332052000341006