A Review on Impact of Mentor System on Quality Enhancement in Higher Education Institutions

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Abstract

This review investigates the profound impact of mentorship programs on postsecondary education, synthesizing existing literature and empirical evidence to illuminate their multifaceted effects. Mentors play a crucial role in fostering both intellectual growth and personal empowerment, guiding students through complexities, setting goals, refining skills, and boosting self-confidence. Their exemplification of resilience, professionalism, and lifelong learning inspires students and contributes to institutional excellence. Particularly significant is the role of mentorship in supporting underrepresented students, fostering academic identities, and enhancing professional development. Faculty mentorship is identified as pivotal in graduate education, shaping student achievement and career advancement. However, the success of mentorship programs necessitates robust institutional support, emphasizing the importance of policies and resources that prioritize mentorship and embrace diversity. Overall, this research advocates for the widespread adoption of mentorship programs in postsecondary education to ensure equitable opportunities and institutional excellence.

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1. Introduction

A key factor in determining how students develop both academically and personally at higher education institutions is the mentor system. With the complexities of modern education, students often face challenges ranging from academic struggles to personal uncertainties. Mentors act as dependable advisors, providing not just academic support but also priceless counsel and inspiration to overcome these obstacles. Mentors assist students in setting goals, gaining necessary skills, and building self-confidence through consistent contacts. Additionally, mentors are frequently used as role models because they exhibit professionalism, resiliency, and a dedication to lifelong learning. Because of this, the benefits of mentorship go well beyond a student's academic performance to include their general development and wellbeing. Evaluating the success of mentorship programmes in higher education institutions has garnered a lot of attention in recent years. This increased interest is a reflection of a wider understanding of the important role mentors play in improving educational quality and supporting student achievement. Scholars and instructors alike endeavour to comprehend the complex dynamics of mentoring, examining elements including mentor-mentee connections, programme design, and institutional backing. Scholars look at case studies and empirical data to find best practices and ways to maximise mentorship programmes. Ultimately, the goal is to create nurturing environments where students can thrive academically, professionally, and personally, thereby enriching the overall educational experience within higher education institutions.

This research paper aims to investigate the influence of mentor systems on the quality of enhancement in higher education establishments, taking these factors into account. The objective of this review is to offer insights into the various advantages of mentorship and its consequences for student achievement and institutional excellence by combining the body of existing literature with empirical data. This review aims to clarify the transformative potential of mentorship in higher education by a thorough analysis of the theoretical frameworks, empirical findings, and practical consequences.

2. Theoretical Foundations of Mentorship

In response to a national study revealing a high dropout rate among undergraduate students, the University of Venda implemented an academic mentoring program in 2012 [1]. A study assessing its impact on students' performance in the Department of Communication and Applied Language Studies found a significant increase in pass rates from 80% to 92% after the program's introduction. The study combined qualitative and quantitative methods, concluding that the mentoring program contributed to improved student success. However, it recommended further evaluation of additional causal mechanisms and better monitoring and evaluation mechanisms. The challenges encountered by faculty members in a consortium of 13 Liberal Arts Colleges (LACs) [2]. It advocates for a shift towards personalized faculty development programs, emphasizing human resource principles and the development of the individual rather than task-specific skills. The aim is to tailor programs to meet the diverse rank-based needs of faculty members. A novel course called Entering Research was developed to support beginning undergraduate researchers, aiming to enhance their educational experience and retention [3]. This course creates a learning community to parallel the Entering Mentoring course for graduate students and faculty. Evaluations show significant gains in students' skills, knowledge, and confidence as researchers compared to a control group.A comprehensive evaluation of an educational intervention program aimed at reducing minority attrition from the biological sciences demonstrated its effectiveness [4]. Participants had greater odds of persisting in basic math and science courses and were more likely to graduate in biology. The program also increased the likelihood of pursuing graduate study, thus addressing the problem of underrepresentation in science.The exploration and the relationship between faculty validation and student persistence among community college students [5]. Higher levels of faculty validation predicted a greater sense of integration in college and modestly influenced students' intent to persist, according to Tinto's Longitudinal Model of Institutional Departure.

The rise in non-traditional enrolments has led to a larger proportion of older, part-time, and commuter students in college student bodies [6]. The aim to define nontraditional undergraduate students and develop a conceptual model of the attrition process for these students. Non-traditional students are found to be more affected by the external environment than by social integration variables affecting traditional student attrition.Evidence from a randomized experiment demonstrates the effectiveness of individualized student coaching in improving college retention and completion rates [7]. Inside Track provided coaching to non-traditional college students, resulting in higher persistence rates during and after the treatment period. Coaching proved to be a more cost-effective intervention compared to other methods such as increased financial aid.A study focusing on women faculty members at Harvard Medical School and Harvard School of Dental Medicine found that despite an increasing representation of women in medical school faculties, they remain underrepresented at higher ranks [8]. Lack of effective mentoring may contribute to this disparity. Through a structured questionnaire in 2009, it was found that 54% of respondents had a mentor, and 72% desired mentoring. Availability was identified as the most important mentor characteristic. Mentoring gaps were identified, particularly in areas related to career goals, negotiation skills, and skills needed for advancement. The examination of university-based mentoring experiences and their impact on the perceived comfort of Latina/o college students in the university environment [9]. Given the slow increase in graduation rates among this demographic, understanding the relationship between mentoring and comfort in the university environment is crucial. In a 4.5-year follow-up study, 71 Latina/o students were surveyed initially as 1st-semester freshmen to explore factors influencing university persistence [10]. Academic factors such as high school GPA, entrance exam scores, and college GPA, as well as non-academic factors including self-beliefs, social support, and mentoring, were examined. The study found that self-beliefs and mentoring significantly predicted academic persistence and college GPA. Stronger high school GPAs, more mentoring, and positive initial academic persistence decisions were associated with higher graduation rates. The figure 1 shows the mentoring cycle in higher education system.
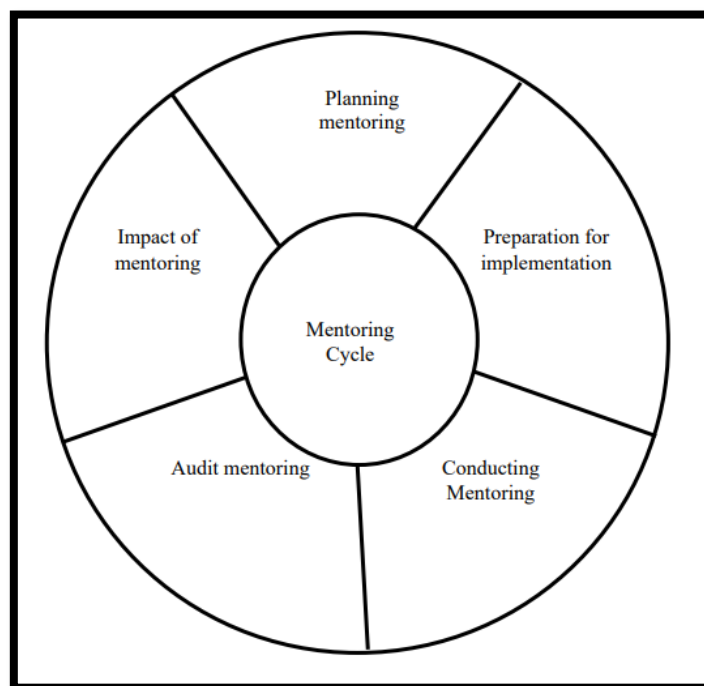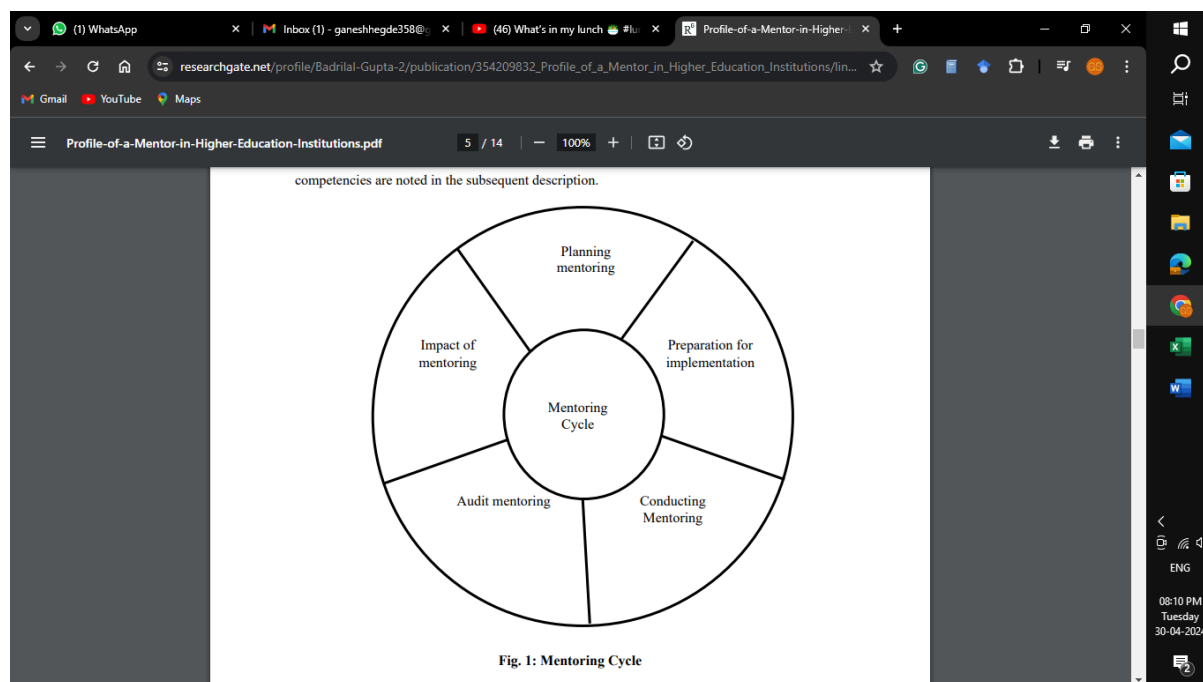
competencies are noted in the subsequent description.

Fig. 1: Mentoring Cycle
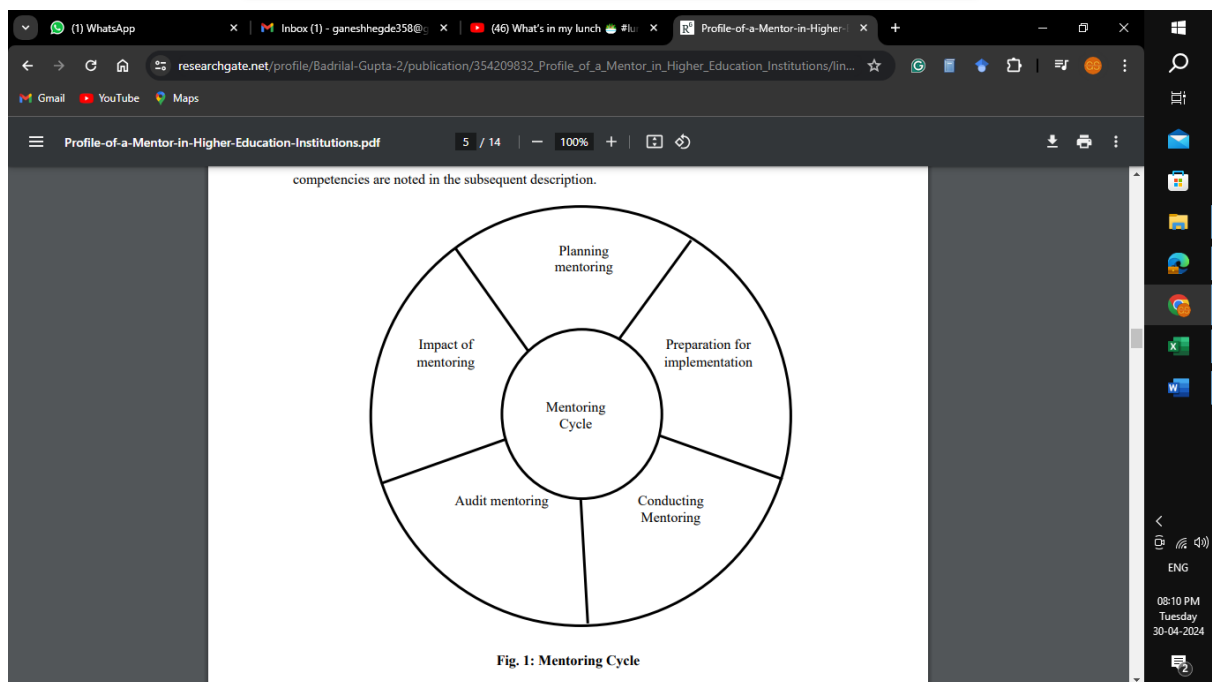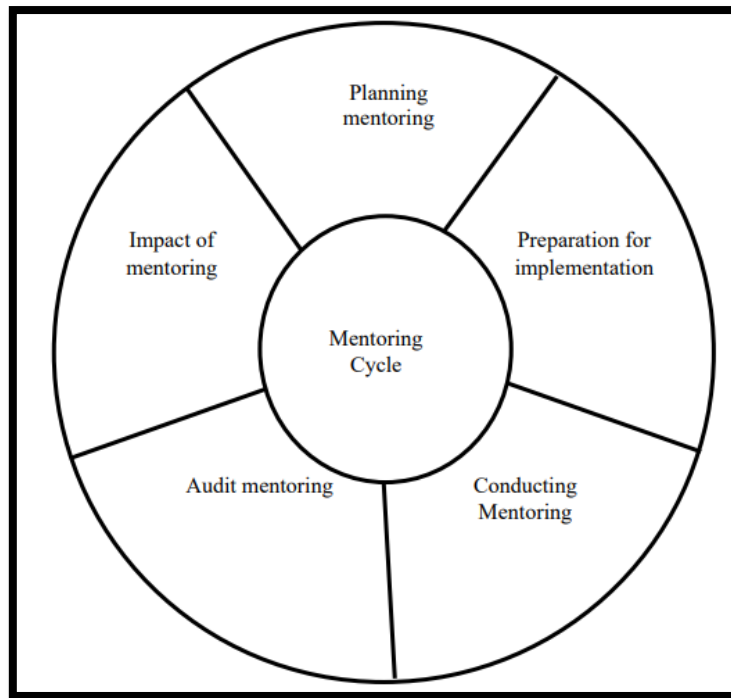
Figure 1: Mentoring cycle in Higher Education System

3. **Historical Evolution of Mentorship Programs in Higher Education**

A program aimed at attracting and retaining non-traditional students in computer science through sustained peer and faculty mentoring was described [11]. The program, emphasizing socially-inspired learning within a community, includes a STEM Incubator course, hands-on projects, a sandbox lab, and a mentoring system. Initial data on enrollment and retention, along with student questionnaires; indicate promising outcomes for the program's success and sustainability. A study comparing graduate student mentoring experiences between samples of United States and Turkish students in counselling psychology found that US students perceived higher levels of socio emotional support and satisfaction in their mentoring relationships [12]. Differences in mentoring experiences were associated with various program outcomes, suggesting the importance of cultural contexts in the translation of counselling psychology.

The utilization of data from a national study involving over 110,000 participants to explore the influence of mentorship on leadership development in college students [13]. Results show that leadership capacity is impacted by the mentorship process and the type of mentor, informing best practices for mentoring in student leadership development.A

study examining the long-term academic effects of mentoring relationships in higher education found that mentored students had higher GPAs, completed more units, and had a higher retention rate compared to non-mentored students [14]. While there were no significant differences in graduation rates, mentored students pursued graduate study and teaching credentials at a higher rate, particularly when matched with mentors of the same ethnicity. The investigation of the role of race and culture in successful mentoring relationships in graduate school [15]. Grounded theory analysis revealed five themes significant to multicultural mentoring, forming a model emphasizing career support tailored for ethnic minorities, relationality between mentors and protégés, contextual significance, and multidirectional interactions.

A web-based survey of members of the Society for the Advancement of Chicanos and Native Americans in Science tested a model linking science support experiences to commitment to science careers [16]. Results supported the mediating role of psychological variables such as science self-efficacy and identity as a scientist in the relationship between science support experiences and commitment. An evaluation of a mentoring program supporting the transition of first-year psychology students found positive changes in aspects associated with student success and psychological literacy [17]. The program enhanced deep and strategic learning approaches, leading to increased success for undergraduate psychology students. Providing a controlled evaluation of a peer mentoring scheme within UK universities, focusing on its effects on wellbeing, integration, and retention among first-year undergraduates [18]. Results suggest that peer mentoring enhances integration to university and reduces intentions to leave, particularly during the transition to university. Findings from this study highlight the varied perspectives among students, instructors, and mentors regarding the roles, risks, and benefits involved in peer mentoring relationships [19]. Different roles enacted by mentors include connecting link, peer leader, learning coach, student advocate, and trusted friend. An examination of the construct validity of the College Student Mentoring Scale (CSMS) revealed valid constructs related to mentoring functions provided to students in higher education [20]. The study suggests implications for student affairs practice and future research in understanding mentoring relationships. The demonstration of the impact of mentoring on community college students' persistence decisions [21], showing that mentoring significantly predicts social and academic integration, thus indirectly influencing students' intent to persist in college. In response to the growing support for mentoring programs in higher education, this article updates a previous review by Jacobi, aiming to refine the definition and characteristics of mentoring for college students [22]. It synthesizes empirical literature and proposes a theoretical framework to advance the understanding of mentoring in academia. Acknowledging the importance of mentoring for first-year student success, article explores a college's approach to defining mentoring functions [23]. By clarifying the concept of mentoring, administrators and mentors can better support students and deliver effective mentoring experiences. While traditional mentoring models have been well-studied in business settings, there is a lack of research on faculty mentoring in academia [24]. Suggestion to professors may benefit from a portfolio of mentors to develop career competencies, highlighting the need for multiple mentoring relationships across their academic careers. The South Africa-Netherlands research Programme on Alternatives in Development (SANPAD) aims to foster a research culture and develop research capacity to address development priorities in South Africa, emphasizing the importance of adequate support and funding for a quality research community [25]. Figure 2 shows the mentoring circle.
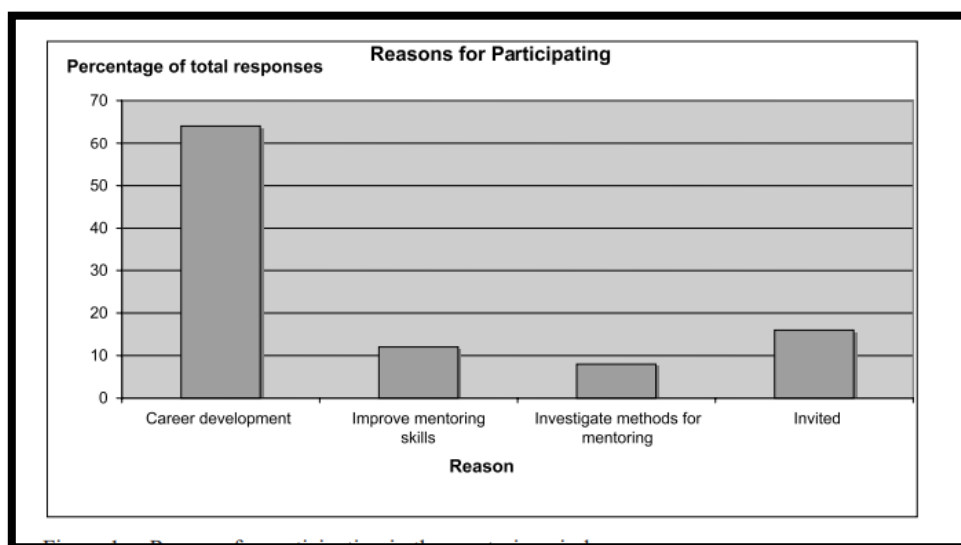

Figure 2: Improving of mentoring circle

4.Benefits and Significance of Mentorship in Higher Education

The study explores the mentoring experiences of graduate and postdoctoral students who mentor undergraduates in research, an area often overlooked. It highlights a wide range of benefits reported by these mentors, including enhanced qualifications, career readiness, personal growth, and improved teaching skills. Despite facing some challenges, mentors reported twice as many gains, suggesting a positive overall experience. The study proposes that understanding these mentoring dynamics can offer insights into the advantages of undergraduate research experiences for graduate and postdoctoral students [26].This narrative recount Bernie's struggle with feeling disconnected from his college experience and contemplating dropping out. Through supportive conversations and mentorship, Bernie gained confidence and found his voice in the classroom. Ultimately, he chose to stay in college, graduated with high honors, and pursued further academic success. The story highlights the importance of advising, communication, and mentoring in fostering student success and persistence to graduation, underscoring the significant impact of out-of-class interactions with faculty members on student outcomes [27].The study investigated the impact of undergraduate research programs on underrepresented racial minority students' intentions to enroll in graduate or professional programs in STEM fields. Analyzing data from 4,152 aspiring STEM majors over a longitudinal period, the study employed multinomial hierarchical generalized linear modelling and propensity score matching techniques. Results revealed that participation in undergraduate research significantly increased the likelihood of underrepresented racial minority students indicating plans to pursue graduate education in STEM fields. These findings suggest that allocating funding to undergraduate research programs could effectively bolster the representation of underrepresented racial minority students in STEM graduate education, thereby contributing to diversifying the STEM workforce [28].The findings of the interdisciplinary nature of mentoring research, spanning psychology, organizational behavior, education, and social work. Despite this breadth, there has been limited interdisciplinary dialogue among scholars. The Special Issue aims to remedy this by examining mentoring through the lenses of youth, academic, and workplace mentoring. It seeks to establish a common definition of mentoring, summarize insights from included articles, and propose future steps for developing a multidisciplinary perspective on mentoring [29].

The meta-analysis synthesizes research across youth, academic, and workplace contexts, examining factors influencing protégé perceptions of instrumental support, psychosocial support, and relationship quality with mentors. Drawing from 173 samples and a total of 40,737 participants, the study identifies key antecedents, correlates, and consequences of these perceptions. Notably, positive protégé perceptions are strongly linked to similarity in attitudes, values, beliefs, and personality with mentors. Instrumental support and relationship quality correlate most strongly with social capital, while psychosocial support is closely associated with interaction frequency. Consequences include situational satisfaction and a sense of affiliation. Academic and workplace mentoring comparisons highlight differences in effect magnitude. However, limitations such as cross-sectional designs and single-source data should be considered when interpreting the findings [30].The study examines mentoring as a developmental intervention in both postsecondary education and organizational contexts, drawing on extensive research. It discusses hierarchical and peer-to-peer mentoring, as well as formal, informal, and e-mentoring models, outlining the strengths and limitations of each approach in relation to the goals, contexts, and populations involved. The chapter also delves into the psychosocial and career-related functions of mentoring, providing a case study to illustrate the design, implementation, and evaluation of a mentoring program [31].

The investigation of the impact of mentoring relationships, characterized by a special bond with a non parental adult, on educational achievement and attainment within the general population. It addresses the scarcity of research in this area and seeks to clarify whether mentoring reduces or exacerbates inequality. The results, drawn from a nationally representative sample of youths, reveal two significant findings: first, mentors exert a substantial positive influence on the educational success of youths, and second, the formation and effectiveness of mentoring relationships are influenced by social background and various personal, parental, and peer resources. Interestingly, the study uncovers a paradox where informal mentors may act as both compensatory and complementary resources. While youths with ample resources are more likely to have mentors, those with fewer resources tend to derive greater benefits, particularly from teacher mentors [32].Using a phenomenological approach, it reveals that students function as apprentices within these groups, learning primarily through active participation. Mentoring is distributed among members, with advanced students playing a significant role. The groups serve as communities of practice and epistemic communities, fostering methodological and intellectual proficiency. Student learning is depicted as trajectories, starting with entry into the group and culminating in becoming novice researchers, proficient technicians, or knowledge producers. The study suggests structured experiences for K-12 science education, emphasizing participation in organized research groups with explicit mentoring to prepare teachers for teaching authentic scientific research practice [33].The evaluation and the efficacy of a faculty development program for early career junior faculty, employing interdisciplinary small groups led by senior faculty facilitators over a

two-year period. Through surveys and interim evaluations, it assesses changes in participants' knowledge, skills, and attitudes (KSA) in professional development and scholarship domains, finding significant improvements in writing career goals, aligning activities with goals, and pursuing goal-related activities. These enhancements are more pronounced among female participants and unaffected by academic rank or time since last training. Additionally, the program fosters increased interconnectedness among faculty. Overall, the findings suggest that the program effectively promotes early career advancement and peer networking, particularly benefiting women in academia [34]. The assessments and the impact of the Mentor Accountant Project (MAP), a student peer-mentoring program, on the academic performance of first-year undergraduates. Developed based on existing literature, MAP involves third-year students volunteering as mentors for first-year mentees. The study, conducted in two Scottish universities, compares changes in learning approaches and academic achievement between MAP participants and non-participants. Results indicate that first-year students in MAP maintained their deep and strategic learning approaches better than non-MAP peers and achieved higher academic performance. However, MAP had minimal effect on third-year participants' learning approaches and academic performance compared to non-participants. Overall, participation in MAP is found to be beneficial for first-year students [35].

5. Challenges and Constraints of Mentorship Programs

The study investigates the relationship between early student-faculty interaction and faculty mentorship, utilizing data from the Cooperative Institutional Research Program at UCLA and employing structural equation modeling. It finds that initial contact and communication with faculty during the first year of college significantly influence the likelihood of experiencing faculty mentorship in the senior year, indicating a socialization process wherein early interactions lead to more meaningful mentorship relationships later in college. These findings underscore the importance of fostering supportive relationships between students and faculty from the outset of college and provide valuable insights for institutional practices aimed at enhancing student success and engagement [36].The conduction of in-depth interviews with 52 college graduates entering a Post baccalaureate Research Education Program (PREP) to explore their readiness to apply to doctoral programs in biomedical sciences, particularly focusing on individuals from underrepresented groups in the sciences. Utilizing a theoretical framework integrating identity-in-practice concepts with Bourdieu's cultural capital theory, the study examined the impact of racial, ethnic, and gender identities on education and career trajectories. Five patterns of identity work emerged: Credential Seekers, PI Aspirants, Path Builders, Discipline Changers, and Interest Testers. These patterns revealed differences in perceptions of engagement with science, identity work focus, and expectations for cultural capital. The findings highlight the complexity of graduate education preparation, emphasizing the importance of identity work beyond credential acquisition. This deeper understanding of individual agency suggests a shift away from deficit models towards programs supporting aspiring scientists [37].Examination studies on undergraduate mentoring programs published between 2008 and 2012, identifying twenty studies meeting the inclusion criteria. The assessment focuses on the three key areas of definition, theory, and methods, revealing minimal progress in these domains since prior reviews. However, all studies incorporated the functions of mentoring, with most being guided by a theory or conceptual framework. Notably, the review introduces the construct of social validity, finding it present in half of the studies. Additionally, it highlights a lack of information on primary mentoring program components in 75% of the studies, hindering replication efforts. The review underscores the importance of specifying program components, employing rigorous research designs, and assessing social validity for advancing evidence-based practice in undergraduate mentoring [38].

Exploration of the rigorous nature of graduate studies, particularly doctoral programs, characterized by high academic demands, stress, and conflicting responsibilities. Through the experiences of four doctoral students and a professor, common challenges faced by graduate students are analyzed. The paper proposes the establishment and function of a peer mentoring and support group to assist students and mentors in navigating the complexities of doctoral work. The student-led group serves various purposes, including providing academic support to enhance participation in scholarly discourse, aiding in teaching responsibilities, addressing practical aspects of graduate student life, and improving writing quality. Additionally, the group offers essential emotional support to its members, recognizing the importance of holistic well-being in the academic journey [39].Investigated mentoring and organizational socialization among law faculty in American Bar Association (ABA) approved law schools. Data from 298 respondents were analyzed to explore the types of mentoring (formal or informal) occurring in these institutions and faculty perceptions of their effectiveness. Comparative analysis was employed to examine mentoring's role in organizational socialization by comparing various groups, such as senior mentored faculty to senior non-mentored faculty, and male to female faculty. Results revealed that senior mentored faculty scored higher on certain organizational socialization subscales compared to senior non-mentored faculty. However, differences in organizational socialization were not significant in other comparisons. The study discusses these findings in the context of diversity and provides suggestions for future research [40].The study introduces social network theory and

methods to elucidate mentoring within contemporary career contexts. It presents a typology of "developmental networks" employing key concepts from social networks theory, such as network diversity and tie strength, to conceptualize mentoring as a multifaceted relationship phenomenon. The study proposes a framework illustrating factors influencing the structure of developmental networks and offers propositions regarding the developmental outcomes for individuals engaged in various types of developmental networks in their careers. It concludes by suggesting strategies for testing these propositions and further researching multiple developmental relationships[41].Investigation the role of peer mentoring in higher education, particularly its potential to not only reduce first-year attrition but also to instill academic and personal integrity, which are foundational to graduate and professional identity. Through qualitative analysis, the study examines students' expectations and experiences in a pilot mentoring scheme within a psychology undergraduate program. Both mentors and mentees perceived mentors as integral to aiding the transition to university life. Mentor advice was noted to embody implicit academic values rather than merely offering shortcuts, fostering mentees' reflective thinking about their own development. The study's findings carry implications for promoting student engagement in mentoring programs and underscore the importance of integrating academic values into peer mentorship initiatives [42].The mixed-methods study aimed to describe the types of support peer mentors. The study investigates a formal peer mentoring program for first-year undergraduates, aiming to compare mentors' and mentees' ratings of support, assess their correlation, and determine the impact of discrepancies in ratings on mentees' academic outcomes. Using data from 484 first-year students and 38 mentors who completed a validated measure of mentoring, the study found that while mentors' and mentees' ratings correlated, mentors consistently perceived providing higher levels of support across all mentoring domains. Discrepancies in ratings were inversely related to mentees' academic performance. Qualitative analysis of mentors' responses suggested that they were not always utilized as a resource, and their role was not clearly defined, potentially contributing to observed discrepancies. The study discusses implications for the peer mentor-mentee relationship and peer mentor training [43].Addressing of the the dual needs of graduate students in completing their dissertations and developing mentoring skills for future faculty roles, alongside the growing interest among graduate students in high-impact learning experiences, such as involvement in undergraduate research. The program outlined pairs undergraduate students with graduate students to collaborate on dissertation research projects. Through this arrangement, undergraduates gain hands-on research experience while also gaining insights into graduate school. Meanwhile, graduate students acquire mentoring experience and receive valuable assistance in advancing their dissertations. This initiative thus provides a mutually beneficial solution that addresses the diverse needs of both undergraduate and graduate students within higher education institutions [44].

Evaluation and the efficacy of a Peer-Assisted Study Session (PASS) program for a large class of Bachelor of Health Science (Paramedic) students, primarily composed of mature-aged individuals returning to study after a significant break. Within a first-year bioscience core subject, mentee students voluntarily attended PASS sessions facilitated by second-year Bachelor of Health Science (Paramedic) students serving as mentors. Mentors were selected based on exceptional academic performance, underwent rigorous training, and facilitated sessions with a maximum of 25 mentees. Overall, the program received positive feedback from both mentors and mentees, with observed improvements in academic performance and decreased fail rates among mentees compared to non-participants. Mentees reported enhanced study skills and increased confidence, indicating the program's potential to enhance student transition and retention, particularly among mature-aged students [45].

6. Methodological Approaches in Studying the Impact of Mentorship

The study explored how college mentor assignment and student engagement in mentoring varied based on student and institutional characteristics in the Washington State Achievers (WSA) program. It found that Asian American students were more likely to have mentors, while Hispanic students were more inclined to seek mentor support and valued their mentoring experiences highly compared to White students. Having an assigned mentor was linked to higher college persistence rates overall, particularly when students engaged with mentors for support and valued their mentoring experiences [46].This study examines the experiences of underrepresented students in structured science research programs at four institutions. Through focus group discussions, several key themes emerged, including learning to become research scientists, experiences with the culture of science, and perceptions of racial and social stigma. Participants highlighted essential factors for pursuing a career in science, yet also raised concerns about the impact of race and social stigma on scientific training. Despite challenges, students reported experiencing a collaborative and empowering scientific culture, developing strong science identities, high self-efficacy, and directed career goals through active engagement in scientific research within these programs [47].This article discusses deficiencies in existing research on mentoring, particularly within higher education, management, and psychology. It highlights the need for a standardized definition of mentoring and provides a critical review of empirical research on mentoring and undergraduate academic success. Additionally, it

presents four theoretical perspectives for future research and addresses methodological and substantive concerns [48].

This handbook offers a comprehensive overview of education and training in psychology, covering historic developments, current standards, and emerging trends. It analyzes doctoral and postdoctoral training in clinical, counseling, and school psychology specialties, with a focus on competency models and standards. The handbook aims to capture the current state of education and training while forecasting future directions [49].The description of the implementation of a peer mentoring program to support at-risk students enrolled in elementary algebra courses at an urban community college. Peer mentors, recruited from advanced mathematics classes, provide individualized tutoring and mentoring support. Results indicate that at-risk students performed similarly to their peers and had higher retention rates. The paper targets instructors teaching developmental mathematics and administrators seeking to improve passing rates and student retention in developmental courses [50].This qualitative study delves into a university retention program's structure of opportunity, drawing insights from former peer mentors' experiences. It explores how peer mentors' involvement in the program impacted their social and academic development during college. The findings highlight the mutual benefits of employing peer mentors in retention efforts. Peer mentors, trained to advocate, role model, and bridge connections for program participants, also benefited from institutional support within the program. Notably, peer mentors cultivated crucial peer-to-peer and peer-to-staff social relationships, which contributed to their own retention [51].

The influence of personal and social support factors on students' decisions to engage in formal academic mentoring was studied. It involved 318 Grade 11 students planning to pursue sciences in college, who were surveyed and then invited to participate in a mentoring program during their first college year. Among them, 150 volunteered, while 168 declined. The study's findings confirm that academic mentoring's appeal varies among students, depending on factors such as personality, help-seeking attitudes, academic dispositions, perceived friend support, and transitional support during college entry. These results are discussed within the frameworks proposed by mentoring and social support literature [52].This study examines the experiences of underrepresented students in science research programs across four institutions. Through focus group discussions, several key themes emerged, including the process of learning to become research scientists, encounters with the culture of science, and perspectives on racial and social stigma. Participants highlighted essential factors for pursuing a career in science, yet also raised concerns about the impact of race and social stigma on scientific training. Despite these challenges, students reported experiencing a collaborative and empowering scientific culture, fostering strong science identities, high self-efficacy, and directed career goals through active engagement in scientific activities within these programs [53].The underscores the pivotal role of faculty-student relationships in shaping graduate students' educational experiences. While existing research has primarily focused on mentoring relationships with undergraduates or specific interactions with graduate students, The contributions by examining faculty mentors' roles and responsibilities in their relationships with graduate students. Drawing on interviews with 15 underrepresented faculty members, the findings reveal three key descriptors—Allies, Ambassadors, and Master-Teachers—that encapsulate faculty-graduate student relationships, providing insights into effective mentoring practices in the graduate education landscape [54].

"Successful Research Supervision" provides academics with a research-based framework to improve their effectiveness as research supervisors. The second edition, updated and practical, caters to both new and experienced supervisors. It covers essential topics such as ethical procedures, social media use in research, academic writing support, and co-supervision. The book guides supervisors in project management, emphasizing flexibility, understanding students' values, and selecting appropriate approaches. By facilitating independent study, it helps supervisors guide students towards successful research completion. Essential reading for supervisors aiming to enhance their practice, it complements "Successful Research Projects," a comprehensive guide for postgraduate students facing research challenges [55]. The study describes the author's self-appointed role as an inspector of snowstorms and rainstorms, ensuring the public's safety and access. Despite not having an official position, they took on the responsibility of surveying forest paths and alternative routes, maintaining their accessibility throughout the year. They also built bridges across ravines, ensuring they remained passable and useful for the public [56].

The examination of the mentoring provided by doctoral advisors and its impact on student outcomes. Surveys from 477 respondents across various disciplines at two universities revealed that most students valued mentoring, with over half receiving support from their advisor. Regression analysis indicated that advisor mentoring correlated with student outcomes, although the relationship differed based on the type of mentoring (psychosocial or career), student outcome (satisfaction, presentations, publications), and discipline. The study discusses implications for practice and suggests avenues for future research [57].The book discusses the increasing enrolment of international and culturally diverse students in postgraduate research programs, alongside the rising participation of local culturally diverse and Indigenous

students. With this diversity comes the necessity for academics to engage in intercultural supervision. The author argues for a more nuanced and theoretically informed approach to intercultural supervision, emphasizing the importance of understanding time, place, and knowledge. Drawing from various 'Southern' theories, such as postcolonial, Indigenous, and feminist perspectives, the book proposes fresh insights into intercultural supervision. By challenging assumptions about the universality of Northern knowledge and creating space for Southern, Eastern, and Indigenous knowledges, the book aims to enrich the practice of intercultural supervision. It targets academic supervisors, postgraduate students, researchers, and scholars in higher education [58].The complexities of supervision dynamics, particularly when supervisors and students come from diverse cultural backgrounds was shown. Focusing on Engineering at an Australian university, the study examines how cultural factors intersect with supervision experiences. It explores how supervisors demonstrate transcultural knowledge by offering students choices in supervision methods and instances where students may feel pressure to assimilate to Anglo-Australian norms. Additionally, it highlights ambiguous moments where the line between helpfulness and paternalism blurs, and cultural differences intertwine with personal experiences. The paper offers preliminary insights into how these analyses inform intercultural supervision pedagogy [59].

7. Empirical Findings on the Impact of Mentorship in Higher Education

The investigation of the evolution of educational development programs tailored for research supervisors, emphasizing the transition from early optional sessions to more comprehensive and, in some cases, mandatory programs, particularly in regions like the UK, continental Europe, and Australasia were performed. It delves into the tensions between educational developers and supervisors, with some supervisors resisting these programs due to perceived intrusions into their pedagogical space and suspicions regarding the underlying motives, often attributing them to broader quality assurance agendas and colonial legacies. The study highlights the limitations of administrative-focused initiatives, which are criticized for oversimplifying supervision relationships and offering superficial solutions. It discusses the need for programs to move beyond mere administrative tasks and address the nuanced complexities inherent in supervision dynamics. Furthermore, it examines the "Compassionate Rigour" program as an exemplar of a more nuanced and respectful approach to supporting supervisors' educational development needs, aiming to bridge the gap between administrative demands and the genuine complexities of supervision relationships [60].The study delves into the evolving nature of postgraduate supervision, transitioning from a perception rooted in research extension to one embracing mentoring and teaching. It challenges the traditional notion of 'always/already' autonomous scholars and effective supervisors, highlighting the complex role of supervisors as both mentors and disciplinary gatekeepers. Justine, a new supervisor in Health Sciences, and Catherine, an academic developer in Humanities/Higher Education, seek to enrich this discourse by advocating for a collaborative approach aimed at fostering research students' critical analysis and independent learning skills. Through their initiative, they aim to address the enduring assumption of autonomous students and effective supervisors, contributing to the ongoing evolution of supervision pedagogy [61].

The interpersonal relationships impact students' academic motivation, engagement, and achievement, framing educational theory and practice within a relational context were made. It synthesizes influential theories including attribution, expectancy-value, goal, self-determination, self-efficacy, and self-worth motivation theories, exploring their implications for students' interactions with significant others in their academic lives. It proposes a trilevel framework to enhance student outcomes, encompassing interventions at the student level (universal programs, targeted interventions, extracurricular activities, cooperative learning, and mentoring), teacher- and classroom-level actions (connective instruction, professional development, teacher retention, training, and classroom composition), and school-level actions (building community and effective leadership) [62].The study investigates the effectiveness of the Meyerhoff Scholars Program at the University of Maryland, Baltimore County (UMBC), with a focus on its impact on underrepresented minorities in science and engineering. Initially exclusive to African American students until 1996, the study specifically analyzes this demographic. Results indicate that Meyerhoff students exhibit higher GPAs, graduate rates in science and engineering, and admission rates to graduate schools compared to multiple current and historical comparison samples. Through student surveys and interviews, key program components contributing to academic success are identified, including Program Community, Study Groups, Summer Bridge Program, Financial Support, Program Staff, and Research Internships and Mentors [63].The paper discusses the documented challenges faced by female faculty members in medicine regarding academic advancement and proposes a novel collaboration strategy to address these issues. This innovative approach aims to enhance academic productivity by fostering completion of academic writing projects through a collaborative work style among peer physicians. Drawing parallels to the construction of a quilt during a "quilting bee," the strategy emphasizes social networking and collaboration to facilitate the completion and compilation of independently prepared sections of an academic paper. By acknowledging the inherent difficulties in achieving work-life balance, this

model offers a supportive environment for female faculty members to overcome barriers and advance in academia [64].

The article evaluates a mentoring program tailored for lesbian, gay, bisexual, and transgender (LGBT) individuals in social work education. Survey responses from 43 mentors and protégés shed light on their program experiences. While the results underscore the necessity of targeted mentoring, some discrepancies in experiences between mentors and protégés are evident. Overall, mentors expressed satisfaction with their participation, viewing it as a means of giving back to the LGBT community. However, protégés sought more specific forms of instrumental and psychosocial support, indicating a need for further refinement in the program to meet their expectations effectively [65].The study, based on a web-based survey of undergraduate researchers who presented at regional sociology association meetings in spring 2011, indicates that while most respondents found their mentored research experiences beneficial, significant differences were observed based on college generational status. First-generation students tended to approach mentoring relationships from a utilitarian perspective, whereas students from families with college backgrounds viewed mentoring as an opportunity for social networking. These findings are linked to the concept of cultural capital, which underscores the influence of social class on educational outcomes. Privileged families tend to cultivate cultural capital through activities that promote cognitive growth and academic achievement, whereas working-class families prioritize tangible, work-related skills. As a result, continuing generation students—those with at least one college-educated parent—are more likely to succeed academically and professionally compared to first-generation students, who lack the implicit cultural skills acquired from their parents. This research underscores how students construct the meaning of their educational experiences in ways consistent with their social class, with working-class students viewing schooling as a credential for careers and middle-class students seeing college as a period of self-development [66].

The study explores the impact of STEM enrichment programs on students' identification as scientists and their subsequent enrolment in graduate science programs in the United States. It indicates that participation in such programs positively influences student performance, degree completion, interest in science, and enrolment in graduate studies. The research suggests that beyond academic performance and research experience, students' identification as scientists plays a crucial role in their decision to pursue graduate studies in STEM fields. Using identity theory, the study reveals that science identity, along with research experience and college GPA, mediates the effect of enrichment program participation on graduate school enrolment. Furthermore, it demonstrates that science identity enhances the influence of academic achievement on graduate school enrolment. These findings underscore the importance of considering both the social and academic dimensions of STEM education in policy initiatives aimed at improving representation in STEM graduate programs [67].The study exploring the impact of STEM enrichment programs on students' identification as scientists and their subsequent enrolment in graduate science programs in the United States is referenced as [67].The study investigating the dimensions of mentoring experiences among undergraduate students in higher education institutions and aiming to develop a comprehensive conceptual framework is referenced as [68].The meta-analysis examining gender differences in mentor- and protégé-reported experiences and benefits in mentorships is referenced as [69].

The paper evaluating a six-week peer mentoring program for first-year education students, providing insights after four years of operation, is referenced as [70].The study investigates mentoring within capstone courses for senior engineering students, aiming to provide a systematic exploration of pedagogy and effectiveness. While faculty roles in these courses have often been described anecdotally as mentoring, few empirical studies have been conducted. The study employs Kram's model of mentoring as a framework to examine mentoring within the capstone course more systematically. Additionally, it utilizes learning theories supporting project-based learning to gain insight into the functions and practices used by faculty mentors to support students' career and psychosocial development [75].

8. Implications of Mentorship for Quality Enhancement in Higher Education

The study surveyed 12 facilitators of a mentoring seminar from nine institutions, all of whom regarded facilitating the seminar positively and recommended it to colleagues. Most facilitators reported a change in their philosophy of mentoring, becoming more aware of students' needs and more proactive in addressing them. Mentors who participated in the seminar showed significant improvements compared to those who did not, including discussing expectations with undergraduate researchers, considering diversity issues, and engaging in mentoring discussions with peers and faculty. Trained mentors reported gains in various areas and expressed satisfaction with the seminar topics. Additionally, students mentored by seminar-trained mentors reported better experiences, including increased availability, interest, and independence from their mentors. While there was no significant difference in undergraduates' experiences based on mentor participation in the seminar, trained mentors' assessments aligned more closely with students' self-assessments, suggesting increased accuracy in evaluating students' skills. Overall, the seminar positively influenced mentoring practices and enhanced the accuracy of undergraduate students' self-assessment of their skills [76].The study conducted a randomized

controlled trial (RCT) across 16 academic health centers from June 2010 to July 2011. Eligible participants were faculty mentors of trainees engaged in clinical/translational research for at least 50% of their time. The intervention involved an eight-hour, case-based curriculum focusing on six mentoring competencies. The primary outcome was the change in mentors' self-reported pretest to posttest composite scores on the Mentoring Competency Assessment (MCA). Secondary outcomes included changes in mentors' awareness, as measured by their retrospective change in MCA scores, mentees' ratings of their mentors' competency, and reported mentoring behaviours. A total of 283 mentor-mentee pairs were enrolled, with 144 mentors randomized to the intervention and 139 to the control condition. The results indicated that mentors in the intervention group showed significantly higher changes in MCA composite scores compared to controls ($P < .001$), with even greater retrospective changes extending to all subscale scores ($P < .001$). More intervention-group mentors reported changes in their mentoring practices compared to control mentors ($P < .001$). Moreover, mentees paired with intervention-group mentors reported larger changes in retrospective MCA scores ($P = .003$) and more changes in their mentors' behavior ($P = .002$) compared to those paired with control mentors. The study demonstrates that a competency-based research mentor training program can effectively improve mentors' skills [77].

The making of examines the role of a culturally relevant peer and faculty mentoring initiative called SAGE (Supporting Aboriginal Graduate Enhancement) within the Canadian landscape of graduate education is a need. It highlights the challenges faced by Indigenous graduate students, who often lack mentorship and guidance from Indigenous faculty members or allies. SAGE aims to address these issues by providing culturally relevant support and networking opportunities for Indigenous graduate students, fostering a sense of belonging and accountability to academic studies. The paper discusses how relationships formed within SAGE contribute to students' success and calls for more attention to culturally relevant strategies, policies, and approaches to recruit and retain Aboriginal graduate students. It concludes by urging institutions to better support Indigenous graduate student success through institutional policies, programs, and services [78].The introduction of "Adaptive Mentorshipa mentoring model designed to be applicable across various educational and training settings. Derived from contingency leadership approaches, the authors synthesize research findings accumulated over two decades to demonstrate the effectiveness of the AM model was carried out. They describe its rationale, implementation procedures, and consolidate research findings, highlighting strengths and limitations. The authors invite mentorship practitioners and researchers in any professional development field to consider the evidence supporting AM's potential to enhance their mentoring programs [79].The utilization and effectiveness of faculty mentoring programs at business schools in the United States were overlooked. Conducted via a survey of 118 schools accredited by the Association for the Advancement of Collegiate Schools of Business, the findings reveal that mentoring programs are not widespread, and many lack the strategic focus and structure necessary for success. Statistical analysis indicates that mentoring programs adhering to best practices yield greater career and psychosocial benefits, aligning with existing mentoring literature. The study provides insights for institutions to develop successful mentoring programs and optimize faculty resources more effectively [80].The study explores the cross-racial mentoring experiences of White faculty with Black students, a topic that is underrepresented in the literature. By merging cross-racial mentoring theories and ally development models, the authors analyzed interviews with six White faculty who mentored Black students at a predominantly White institution. The findings illustrate how White faculty initiate and nurture mentoring relationships, drawing from their own formative experiences to assist mentees in overcoming challenges. The study concludes by proposing a conceptual cross-racial ally mentorship model to inform practice and address cultural taxation among faculty of color [81].The study investigated the relationship between graduate students' demographic and academic characteristics and their preferences for three styles of mentoring: Integrity, Guidance, and Relationship. Participants were Ph.D. students from two Midwestern Research I Universities (n = 537) who completed the Ideal Mentor Scale (IMS), rating the importance of 34 mentor attributes on a 5-point Likert scale. The analysis revealed significant differences in demographic variables: women scored higher than men on Integrity, international students scored higher than domestic students on Relationship, and age was inversely related to Relationship scores. No group differences were found on the Guidance scale. These findings suggest that graduate students' perceptions of the ideal mentor are influenced by socio-cultural factors to some extent, but individual differences may also play a significant role [82].The research conducted focus groups with male and female participants at a Hispanic Serving Institution (HSI) to discuss mentoring of Hispanic graduate students. Through Thematic Analysis, three main themes emerged: Relationship Initiation and Development, Valued Relationship Qualities, and Context and Barriers. Within Relationship themes, participants highlighted mentor attributes such as openness, trust, commitment, availability, and grant assistance. Barrier themes encompassed gender roles, financial insecurity, social inequality, and language differences. Females identified one unique theme, while males emphasized the negative impact of work obligations on mentoring [83].

A study published by AAAS found that engagement in various research-related activities, such as attending conferences and authoring journal papers, correlated with positive outcomes, including increased interest in STEM careers. Longer research durations and a diverse range of research tasks also contributed to positive outcomes, with 30% of researchers with over 12 months of experience expressing intent to pursue a Ph.D. Conversely, certain activities like preparing written reports showed little correlation with positive outcomes. The timing of research (summer vs. academic year) and mentoring characteristics, as measured by structured questions, didn't strongly correlate with positive outcomes. However, qualitative responses highlighted the importance of effective faculty guidance, suggesting that mentors who possess enthusiasm along with interpersonal, organizational, and research skills significantly contribute to fostering positive outcomes in undergraduate research programs [84].In this research, the authors developed the Advisory Working Alliance Inventory (AWAI) to assess the quality of the graduate advising relationship from the perspective of students, drawing from existing literature on working alliances. The inventory was tested with 281 counseling psychology doctoral students, revealing three factors (Rapport, Apprenticeship, and Identification-Individuation) and demonstrating strong internal consistency reliability [85]. The study introduces the Advisory Working Alliance Inventory-Advisor Version (AWAI-A), developed to assess the quality of the graduate advising relationship from the perspective of faculty members in counseling psychology programs. Through two studies involving 236 and 44 advisors respectively, the AWAI-A revealed three subscales: Rapport, Apprenticeship, and Task Focus, demonstrating strong internal consistency, concurrent validity, test-retest reliability, and discriminant validity. The findings emphasize the significance of the advising working alliance in doctoral training and offer insights for future research in this domain [86].

This explained the effectiveness of promoting diversity in the scientific research community by analyzing the outcomes of students enrolled in a National Institutes of Health-funded minority training program compared to a matched control group. Using Growth Curve Analyses with Hierarchical Linear Modelling, the research reveals that students supported by the Research Initiative for Science Excellence were more inclined to persist in their aspirations for a scientific research career. Furthermore, undergraduate research experience emerged as a significant predictor of student persistence in science, whereas having a mentor did not show a similar effect. This suggests that targeted programs like the Research Initiative for Science Excellence contribute positively to fostering diversity and promoting persistence in scientific career aspirations among underrepresented students [87].The study investigates the effectiveness of National Institutes of Health Minority Opportunities in Research (MORE) Division Office programs in promoting academic success and advanced degree pursuits among traditionally underrepresented groups in the sciences. Analyzing outcomes at a minority serving comprehensive university, the research compares academic achievements of undergraduate program participants with a propensity score matched comparison group. Findings reveal that MORE program-supported students achieved higher GPAs at graduation, graduated more quickly, and were more likely to obtain science degrees and enter Master's and doctoral programs in the sciences. These results underscore the importance of rigorous research in assessing the impact of federally-funded programs aimed at addressing underrepresentation in the sciences [88].This study explores how the status of mentors (supervisor vs. non-supervisor) and gender similarity (homogeneous vs. diversified) within mentor-protégé dyads affect protégés' perceptions of mentoring functions and outcomes. Data from 217 mentor-protégé dyads, consisting of working professionals from various industries, were collected and analyzed. Results revealed that supervisory mentors tended to provide more career development functions compared to non-supervisory mentors. Additionally, the interaction between mentor-protégé gender similarity and mentor's supervisory status influenced psychosocial support, career development, and career satisfaction. The study highlights implications for future research and career counseling in both industry and education contexts [89].The study investigates the effectiveness of the Meyerhoff Scholarship Program (MSP) in integrating primarily Black students into the science community by offering academic, social, and professional support. Three groups of MSP students were examined: new Meyerhoff students participating in Summer Bridge, currently enrolled Meyerhoff students, and MSP graduates currently pursuing or having completed STEM graduate studies. Participants highlighted the significance of various MSP components such as financial support, the Summer Bridge Program, formation of Meyerhoff identity, belonging to the Meyerhoff family, and network development. These elements contribute to the academic and social integration of students, fostering their development as scientists and facilitating achievement of academic and career goals [90].

This study investigates the suitability and benefits of undergraduate research experiences for students across different academic levels, genders, and major disciplines. Using the Undergraduate Research Questionnaire (URQ) to measure cognitive factors associated with research benefits, data was collected from undergraduates at a large public research university. Significant predictors of URQ factors included grade-point average (GPA), college credits, lab course credits, gender, major discipline, and frequency of faculty and peer meetings. Men tended to achieve higher URQ scores

than women, and students with below-average GPAs or limited research participation showed diminished benefits over time. Additionally, gains from research varied by major discipline. The findings suggest that not all students benefit equally from research experiences, emphasizing the importance of considering individual differences and disciplinary contexts in promoting inclusive and effective undergraduate research participation [91].This study explores the role of student-advisor interactions in undergraduate research (UR) within the framework of situated learning theory. Conducted with 73 undergraduate research students from two research-intensive institutions, the research identifies a continuum of mentor practices across three domains: professional socialization, intellectual support, and personal/emotional support. Novice students benefit from clear expectations and project orientation, while experienced students require broader socialization into scientific traits and habits. Notably, underrepresented minority students, and to a lesser extent women, gain confidence and broaden their career possibilities through mentorship interactions. The study underscores the importance of mentorship in UR, highlighting its dual role in scientific and educational development and its impact on students' identities and career paths within research-intensive university settings [92].This study investigates the impact of formal mentoring programs on new academics, utilizing evaluative data from a pilot mentoring initiative to discern the needs and networks of new staff. Key findings highlight the varying levels of support needed among new academics, common needs in professional development regardless of disciplinary background, and differences in mentoring preferences influencing program participation. While participants reported both benefits and drawbacks of program involvement, a prevalent academic mentoring mindset was identified, potentially affecting mentoring outcomes based on protégés' demographic characteristics. The study underscores implications for administrators overseeing staff development initiatives and suggests avenues for future research in this area [93].This paper outlines the Biology Undergraduate Scholars Program (BUSP), a comprehensive educational enrichment initiative at the University of California, Davis, established in 1988 to support underrepresented minority (URM) students in biology majors. Collaborative efforts between campus academic and student services sectors have shaped both the design and implementation of BUSP. Formative and summative evaluations have been integral to program development, leading to ongoing enhancements in student persistence and performance in basic science courses. Notably, BUSP students entering classes between 1994-1999 consistently outperformed non-BUSP URM students and the White/Asian majority in key science courses like General Chemistry and Calculus. Over time, the percentage of BUSP students persisting to graduation in biology majors has surpassed the campus average, potentially attributable to high rates of research participation among BUSP students [94].The study investigates the mentoring experiences of sport and exercise psychology (SEP) graduate students, a topic with limited documentation in the field. Surveying 104 SEP graduate students, the research identifies both formal and informal mentoring relationships, with mentors generally perceived positively. However, regression analysis indicates that mentoring towards professional development significantly predicts positive mentoring evaluations. Notably, peer mentoring is prevalent in SEP at a higher rate than in other disciplines, with professional mentoring preferred for research and writing productivity, while peer mentoring enhances the graduate student experience. These findings suggest the potential benefits of incorporating mentoring into SEP graduate school programs [95].

This article introduces a mentoring model tailored to women graduate students, developed through a pilot survey of 55 women graduate students across the United States and qualitative interviews with 8 distinguished women psychologists. The model builds on existing research to offer hypotheses, an operational definition, assumptions, and strategies for forming, structuring, managing, and maintaining mentoring relationships. It outlines the roles and functions of mentors, mentees, and the relationship itself, while also addressing how mentoring relationships evolve over time. Although rooted in research with women, the model's principles are applicable to both men and women in mentoring contexts [97].

The four lines of inquiry regarding mentoring: perceptions of successful mentoring, mentoring of doctoral dissertations, mentoring in the online environment, and the relative importance of mentoring behaviors. The authors identified 94 mentor behaviors and characteristics, which were then condensed to 55 by removing redundancies. These were organized into a conceptual model with two domains: academic and psychosocial. The academic domain comprises competence, availability, induction, and challenge, while the psychosocial domain includes personal qualities, communication, and emotional support. The study discusses the implications of this model for further research, offering a comprehensive framework for understanding and evaluating mentoring relationships [98].This shown demo of the challenge of low graduation rates in science, technology, engineering, and mathematics (STEM) disciplines, particularly among students from underrepresented groups. It highlights the Howard Hughes Medical Institute (HHMI) Professors Program at Louisiana State University, led by HHMI Professor Isiah M. Warner, as an example of a successful program designed to retain students in STEM majors. The program's mentoring model integrates academic interventions with structured research experiences to help STEM undergraduates develop metacognitive strategies for academic success and

deepen their understanding of science. Comparative analysis demonstrates the positive impact of this model on STEM retention and graduation rates, especially among underrepresented students [99].This explored the concept of mentoring in emergency medicine (EM), an area where relatively little literature exists compared to other fields in academic medicine. Through a literature review, the authors discuss various models of mentoring, factors contributing to effective mentorship programs, and the roles and responsibilities of both mentors and mentees. Additionally, the paper addresses specific issues related to mentoring female, minority, and research physicians in the field of EM. Several case scenarios are presented to offer practical guidance for both mentors and mentees in EM settings [100].

9. Conclusions

Higher education's mentorship programme is essential to Mentees' holistic development since it fosters both intellectual and personal development. Mentors help students negotiate complexity and contribute to goal-setting, skill development, and self-confidence by offering support, direction, and inspiration. In addition, they set an example for others by being resilient, professional, and dedicated to lifelong learning. Mentorship programs have gained attention for their role in enhancing educational quality and supporting student achievement. The purpose of the study is to determine how mentorship programmes affect the standard of improvement in postsecondary education. It highlights the transformative power of mentoring and its significant influence on student achievement and institutional excellence by synthesising existing knowledge with actual evidence. Mentorship is particularly important in supporting underrepresented students, fostering strong academic identities, and enhancing professional development. The success of mentorship programmes is shaped by social and cultural variables, underscoring the significance of inclusive practices and culturally appropriate support. Faculty mentorship is central to graduate education, contributing to student achievement and career advancement. Institutional support is essential for the success of mentorship programs, emphasizing the need for policies and resources that prioritize mentorship and diversity.

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