

Engineering Educators' Perspectives on Framing Mentorship Strategy at Autonomous Institute -A Qualitative Study

Shradha Binani¹, Nayini Varshitha Reddy², Mihir Patel³, Thakur Aryan Singh⁴

¹Department of Chemistry, Hyderabad institute of technology and managment, Telangana (E),

^{2,3,4}Undergraduate student, Hyderabad institute of technology and managment, Telangana (E),

*Corresponding Author

Email: shradhabinani88@gmail.com, nayinivarshitha2004@gmail.com, mihirpatel0427@gmail.com, singharya2004@gmail.com

Abstract— Mentoring is inevitable for the success of all student populations in engineering education. Early in their careers, young engineers can benefit greatly from the advice and support of faculty mentors. To assure that engineers are ready to join the industry being qualified both academically and professionally, it is vital to improve undergraduate engineering colleges' perspectives on mentoring. The study explores how engineering educators of an autonomous institution in South India perceive mentorship programs in undergraduate education by qualitatively assessing their perceptions. A total of 15 engineering educators were interviewed through a questionnaire consisting of open-ended questions. The following themes emerged from an analysis of the faculty responses viz., opinions of mentoring in engineering education, elements of successful mentoring, physical and mental health, skill development, defining short and long-term goals, trust and openness in the mentor-mentee relationship and Effective Mentoring strategy. The research analyzed the variations in the responses of participants based on their educational background and prior involvement in mentoring programs. The research aligns with the ZPD (Zone of Proximal development) model, which suggests that mentors can serve as a valuable resource for promoting both personal and professional growth. The article explores the limitations and advantages of experienced engineers and educators serving as mentors for students who are young engineers in practice. The results of this research will serve as a reference for engineering institutions to create a successful and integrated mentoring program that supports the mentee's overall development and career.

Keywords— Mentoring, Mentee, Physical and Mental health, Roles of mentoring, Skill development, Trust and confidentiality.

JEET Category—Choose one: Research, Practice, or Op-Ed. (Please note, Op-Eds are by invite only. Refer to the Paper Submission and Review Guidelines for more details.)

I. INTRODUCTION

Mentoring programs became an integral aspect of career development and human resource growth in corporate,

This paper was submitted for review on September 10, 2023. It was accepted on November, 15, 2023.

Corresponding author: Shradha binani, Department of chemistry, Hyderabad Institute of Technology and Management, Telangana, India

Address: HITAM, Gowadavelli, Medchal.500014 (e-mail: shradhabinani88@gmail.com)

Copyright © 2023 JEET.

industrial and government organizations with the advent of mentoring programs in the 1970s. The main goal of these programs was to ensure that individuals with potential for higher positions always had a mentor to guide and monitor their career progress (Hansman, C. A. 2002).

Mentoring, a less formal type of relationship, has been acknowledged to assist and socialize aspiring mentee's by focusing on their personal and professional development. Mentoring relationships benefit both students and mentors, and they help maintain continuity in the profession as current generations learn from experienced mentors (Black, L. L. et al., 2004).

It is a vital and intricate relationship that promotes growth and success of individuals. Care should be taken to ensure compatibility between the mentor and protégé before entering the relationship. Poor communication and unclear objectives are potential problems, but they can be addressed through personal reflection, open and non-accusatory communication, and establishing alternative support networks (Reed, J., & Koliba, C. 1995). Mentoring, despite its recognized advantages, is not widely used and poorly understood in the fields of undergraduate education. Graduate students often lack mentoring relationships (Thomas, K. M. et al., 2007). One reason for this may be the absence of a clear definition of mentoring, uncertainty about the responsibilities of mentors and mentees, and a lack of information about how to start a mentoring relationship. This leads to a gap between the promotion of mentoring and its actual implementation, despite its well-established virtues (McPartland, J. M. et al., 1991).

Mentoring is a common occurrence that is touted as a valuable way to support individuals. (Schein, E.H.1996). The mentoring process is dynamic, fluid, and complex, and it takes time to form. Mentoring involves interaction and cannot be established overnight. For a long time, mentoring has been praised to educate and familiarize the upcoming generation of professional counselors and counselor educators. (Mullen, C. A. et al., 2021). The mentor-mentee relationship evolves and matures through social interaction. It is believed that the success of mentoring relationships depends on the mentors' skills and knowledge, but also requires building both professional and personal connections (Jackson, V. A. et al., 2003). Thus, a systematic approach to mentoring and developing relationships can support mentors in their role. The

success of a mentoring relationship relies on various factors, including the personal and professional attributes, abilities, and techniques of both the mentor and mentee, the environment in which the relationship operates, and the selection and compatibility of the individuals involved (Sng, J. H. et al., 2017).

The significance of a successful mentoring relationship depends on several factors, such as the personal and professional qualities, skills, and practices of the mentor and mentee, the context in which the relationship operates, and the choice and matching of the individuals involved in the relationship (Sambunjak, D. et al., 2010). The mentor-mentee relationship evolves and matures through social interaction, and requires not only the mentor's skills and knowledge, but also building both professional and personal connections. (Clutterbuck, D. et al., 2005). A structured approach to mentoring and relationship building can aid mentors in their work (Maruta, T. et al., 2013). The goal of this research is to provide a framework for forming successful mentoring relationships that benefits both mentors and mentees and contributes to the continuity of the profession. The objective of this study is to create a framework for understanding the complexities and processes involved in forming successful mentoring relationships. The goal is to identify the various types of mentoring relationships, determine the factors that support or hinder their formation, and provide a new insightful and conceptual framework. Using a general inductive approach, the study aims to determine the traits and characteristics that lead to successful mentoring relationships, as well as the factors that may prevent them. By tracking mentor-mentee relationships over time, which will determine the components that influence their formation and provide insight into what makes them successful or unsuccessful.

II. LITERATURE

Many research studies have shown that mentoring, in all its forms, leads to various positive outcomes such as increased productivity, better professional and academic success, a stronger sense of identity, better job opportunities, heightened self-confidence, and more (Gunn, F. et al., 2017, Jackson, D. et al., 2017). Recent literature theories on mentoring emphasize the importance of viewing it as a reciprocal developmental relationship that promotes learning, growth, and progress for both mentors and mentees (Klasen, N. et al., 2012). This includes direct benefits of mentorship programs as well as longer-term outcomes related to career success and job satisfaction. Previous studies have provided valuable information on the short-term and long-term benefits of mentorship. However, few studies have explored the factors that impact the benefits of mentorship for mentors. One study (Goldner, L. et al., 2021) found that after controlling for relationship characteristics (such as duration) and mentor variables (such as gender), mentors' perceptions of similarity with their mentee was linked to their evaluations of the training and quality of their relationship.

Mentoring can also help individuals develop interpersonal skills and abilities that enhance career outcomes, such as

career advancement, job satisfaction, and effectiveness, for both mentors and mentees (Binani, S. et al., 2022). Few literature studies hold the view that having well-defined goals and clear job performance standards can assist new leaders in taking important initial steps with ethical standards at undergraduate level (Bozionelos, N 2004). Experienced mentors who understand how to put leadership standards into practice can be crucial in helping new leaders align their actions with the goals and expected outcomes of stakeholders (Ragins, B. R. et al., 2007). Additionally, a persistent and determined approach to pursuing a goal often leads to a higher level of achievement (Mullen, C. A. et al., 2012).

The ideal mentor-mentee relationship should be based on elements such as respect, trust, understanding, and empathy (Binani, S. 2022). The mentor should be a good listener, pay attention, and be able to help solve problems, while also being responsive to the mentee's needs, goals, and desires (Carmel, R. G. et al., 2015). The five elements of a successful mentoring relationship include: (1) it is a supportive relationship aimed at helping the mentee reach their goals; (2) the interactions should cover career growth as well as provide psychological and emotional support; (3) the relationship should be beneficial for both the mentor and mentee; (4) the relationship should be personal and require attention to personal qualities such as honesty, effective communication, and concern; and (5) the mentor usually has greater professional experience, influence, and success in their field compared to the mentee (Lechuga, V. M. 2011, Chopra, V. et al., 2018).

Establishing and working towards personal and professional development goals is a crucial aspect in the effective transfer of new knowledge in mentor-mentee relationships (Kram, K. E. et al., 1985). Mentoring can be described as a purposeful pairing of a more experienced person with a less experienced one, with the goal of helping the latter grow and acquire specific skills (Murray, M. 1998). Mentors impart valuable insights into the customs, values, and norms of the organization, offer support, guidance, and protection to the mentee, and provide feedback and information to aid the mentee in achieving their goals (Gibson, D. E. et al., 1999).

Few studies have highlighted an ethical dilemma faced by freshman engineering students when making decisions about their short- and long-term goals and the skills they need to achieve them (Douglas, C. A. 1997). Mentors from corporate and government entities can increase students' awareness of post-graduate opportunities by sharing their own career progression with their mentee and providing useful insights on how their coursework can be applied in the workplace. By setting goals and serving as experienced professionals who provide clear guidance and a framework to help mentees analyze and understand their career goals, career mentoring supports the mentee's advancement within an organization or in their chosen field (Bryant-Shanklin, M. et al., 2011). Additionally, to address the issue of high retention rates among first-year students, some educational institutions have implemented numerous mentorship programs targeted towards freshman students (Besterfield-Sacre, M. et al., 1997). The significance of mentorship in education stems from the mentor's capability to equip the mentee with insights about

their professional path, offer advice, inspire them, give emotional support, and serve as a shining example for the mentee to emulate (Terrion, J. L. et al., 2007).

Despite its well-established benefits, mentoring relationships are not widely used and poorly understood in engineering education (Dockter, J. et al., 2003). There is a lack of clear definition of mentoring, uncertainty about the roles and responsibilities of mentors and mentees, and a lack of information about how to start a mentoring relationship (Whitely, W. et al., 1991). This has resulted in a disparity between the promotion and the practice of mentoring. To bridge this gap, this study aims to identify the various types of mentoring relationships, determine the factors that support or hinder their formation, and provide a new and insightful conceptual framework. The research will use a general inductive approach to determine the traits and characteristics that lead to successful mentoring relationships, as well as the factors that may prevent them. By tracking mentor-mentee relationships over time, the study will provide insight into what makes them successful or unsuccessful. As a part of this study, we develop a framework to assess the experienced faculty members' opinions on mentorship in engineering education.

III. METHODS

A qualitative research approach was utilized to understand how professionals view mentoring in an engineering institute, 26 experts in mentoring design were selected from an autonomous institute in India, based on their diverse backgrounds in management and technical abilities. The individuals were contacted through email and scheduled for an interview after receiving details of the study. A questionnaire focused on the five constructs of mentoring was created and reviewed by the research team before the interview. The interview lasted between 20 to 40 minutes and was conducted in person, recorded, transcribed, and coded. The code was then used for analysis with a deductive approach, which resulted in the identification of three themes: the integration of education and mentoring, the five constraints, and advice for mentors on their mentoring approach. The participants' beliefs and opinions on the mentoring program were also presented.

IV. QUALITATIVE ANALYSIS

The transcribed interviews were thoroughly reviewed to ensure no information was overlooked. A team of four undergraduate students worked together to determine the presence or absence of elements in the five constructs of the mentoring model. Deductive coding was used to analyze the interview transcripts, which is a form of qualitative coding where codes and themes are predetermined and applied to the qualitative data. The five constructs - role of mentoring, physical and mental health, trust and confidentiality, goal setting and skill development - were identified as the major themes in the study. Each student analyzed one interview, reporting the interviewee's examples based on the five constructs of mentoring. The other two students reviewed the analysis and provided feedback for revisions. This process was repeated for all 15 interviews, with one student taking the lead

for each and two others serving as reviewers. The analysis also explored how the interviewees define education through mentoring, the significance of integrating education and mentoring, and their understanding of mentoring. The conclusion of the analysis summarized recommendations for creating an effective mentoring approach that could lead to positive outcomes (Kittur, J. et al., 2021).

V. PROCEDURES

The interviewees were selected based on their wide-ranging and in-depth experience in mentoring and related projects. These participants were reached via email. They were informed about the research study as part of the prior consent process and their participation was voluntary (Binani, S. et al., 2022). Fifteen semi-structured interviews were carried out. The data gathered from the interviews was primarily concerned with perceptions of the use of the five constructs of mentoring such as opinions of mentoring in engineering education, elements of successful mentoring, physical and mental health, skill development, defining short and long-term goals, and trust and confidentiality in the mentor-mentee relationship. Additionally, the data sheds light on how each research participant defines education through mentoring. The questions used in the interview are included in the appendix (Binani, S. et al., 2022).

VI. PARTICIPANTS

The research participants selected for the interview are a leadership team from an engineering institution who have expertise in mentoring students at different stages in their career. 15 participants were recruited, and the table below represents their demographic information.

TABLE I
Demographic information of participants

| # | Pseudo names | Gender | Qualification | Experience |
|-----|--------------|--------|--|------------|
| P1 | Shrayan | Male | B.Tech | 31 |
| P2 | Dhruv | Male | B.Tech in Mechanical, ISB | 21 |
| P3 | Myra | Female | B.Tech(Ph.D) | 22 |
| P4 | Prisha | Male | MSc, Ph.D | 18 |
| P5 | Pahel | Male | B.TECH, M.TECH(JNTU),PHD | 20 |
| P6 | Kiansh | Male | B.S.C , M.C.A, M.Tech ,Ph.D | 20 |
| P8 | Arpita | Female | B.E (MECHANICAL), M.TECH (JNTU), PH.D (JNTU Hyderabad) | 23 |
| P9 | Yuvraj | Male | B-Tech , M.Tech, Ph.D, Rtd.Army officer | 22 |
| P10 | Ashwith | Male | M.Sc, P.HD(Nuclear Physics) | 21 |
| P11 | Sowmya | Female | MBA (Ph.D) | 15 |
| P12 | Aachman | Male | MBA , ISB | 21 |
| P13 | Moulik | Male | Btech,Mtech (Phd) | 16 |

| | | | | |
|-----|-----------|--------|---|----|
| P14 | Aashritha | Female | Btech,Major General,Rtd.Army officer | 30 |
| P15 | Daksh | Male | B Tech,MBA,Freelancer, | 25 |

VII. RESULTS AND ANALYSIS

In this section open-ended survey questions are presented as qualitative data with the themes emerged from the questionnaire. In addition to the description about the themes, the participants' perceptions/understanding about each of the themes is also included.

Theme1: Perceptions about mentoring in engineering education

What is mentoring in your opinion in engineering education?

Mentoring requires an emotional connection and involvement with the student. you need to be personally involved and intentions are very clear that you are interested in their progress and it's something which you don't expect something in return. mentoring is a non-financial relationship.(Dhruv)

Mentoring, in my opinion, is helping students understand And what exactly the students' purposes are and then continuously asking questions to them, And mentors also should be flexible to change their approach. But mentors quality has to be that the mentee should feel that I'm being mentored I'm being cared and being addressed, and that my voice is being heard.a mentor should not be feeling that I'm doing a great favor to the mentee, it should be an integral part, that mentor also should have the satisfaction that I'm part of building some bigger thing and to get purpose.(Shrayan)

Mentoring means basically guiding a person, it has nothing to do with age or you can be a mentor to a much older person.So a mentor is any person who has lived through that Phase that you're living through. He can empathize with you in the way you're thinking... And the beauty is the market place is totally different from what you're being taught in four years. Nobody is corporate ready when they come out of engineering. ...It is like a Magnetic Compass when you are sailing in a Ship. In engineering, especially a mentor who is expertise in their domain will definitely help the youngster, budding engineer to upgrade their skills ... (Myra)

Above participants viz.,Dhruv,Shrayan and Myra exhibited a positive attitude towards opinion on mentoring in engineering education because they agree that mentor require emotional connection and involvement value the mentee as a person and encourage them in the right direction, listen to what is said as well as how it is said, they even assist them in solving his or her own problems rather than providing direction, and aim to develop the mentee into a nice individual for their professional life.

The role of mentors in engineering institutes plays a crucial role in enhancing skills, making better decisions, and gaining new perspectives in life and career. Mentors push their mentees to reach their full potential and provide them with opportunities to expand their network and advance their careers (Fletcher, S. et al., 2012). They also serve as role models, guiding mentees in developing leadership, research, service, and teaching skills. Mentoring relationships foster a sense of community, increase self-confidence and self-worth, and provide motivation. In conclusion, mentoring prepares engineering students with the necessary skills, knowledge, and hands-on experience for a successful career (Dunn, R. E. et al., 1995).

Theme 2: Elements of Mentoring Relationship

What do you perceive as the elements of a successful mentoring relationship or of a failed mentoring relationship and its outcome?

So a relationship here means that the mentor's area of interest shall match with the mentee's area of interest. The frequency match has to happen. So, that relationship is better if your area of interest matches the rest of the things that will automatically follow your mentor and mentees emotional interest, your emotional intelligence.....(Prisha)

.....that kind of trust, that kind of proximity, that kind of closeness, that kind of bonding, that kind of relationship is very essential in terms of making the mentorship programme successful.so the ownership, the commitment, the responsibility has to be there, then only it can be possible then only it can be you know, be a successful model of mentorship(Pahel)

A successful mentor must have a good empathy and he should have that kind of passion to support an instant and he must be a good listener, a good friend,a good guy and must have good leadership skills, communication skills, that's when you must be a very good human being.(Kiansh)

Above Participants viz.,Prisha,Pahel and Kiansh exhibited a positive attitude towards opinion on successful mentoring relationships because they agree that the frequency of this match is important for the relationship to develop further, resulting in emotional and intellectual benefits. Highlighting the importance of trust, proximity, closeness, and bonding in a mentor-mentee relationship for the success of a mentorship program. It is emphasized that ownership, commitment, and responsibility must be present for the relationship to be successful. To be a mentor to be successful, they should possess empathy and a passion for providing support. Additionally, they must be a good listener, a good friend, and have good leadership and communication skills. To be a successful mentor, it is important to also be a good person.

The above findings are lined with conclusions drawn from literature quoting the keys to establish a successful mentoring relationship include creating a relationship of trust, clearly defining roles and responsibilities, establishing short- and long-

term goals, using open and supportive communication, and collaboratively solving problems (Byington, T. 2010). Relationships are essential to the mentoring partnership, yet mentors may not have had professional development on how to develop these relationships which deal with self-efficacy and ethical preparedness to overcome dilemmatic situations in their academic career (Binani, S. 2022). Indeed, mentoring programs help to demonstrate the effects of developing and sustaining positive relationships and how mentors can support their mentees' development (Straus, S. E. et al., 2013). Successful mentorship is vital to career success and satisfaction for both mentors and mentees. Yet challenges continue to inhibit faculty members from receiving effective mentorship (Hudson, P. 2013).

Theme 3: Trust, Openness and Power of relationships

How do you think parameters like trust, openness, and power of relationships must carry out in mentor-mentee relationships?

The trust has to be there, this is the best person to guide me.I can talk about my personal professional life. but when it is mentorship in a college, between the faculty in our teaching community and the students that are ready, then it is like it's an all round mentorship. It's personal, it's a professional, it's about career, it's about life. It's about business, it's about studies, it's about attendance, it's about mental health.So that kind of openness is to have trust, right, you can trust a person with a blind and clotheslines that kind of trust has to be there. The respect for each other has to be there caring for each other as concern for each other has to be their consideration for each of them, and somebody is not feeling well..... (Arpita)

Trust is the first step.what helps in trust is what you have to analyze. So what helps in increasing the trust is not classroom interaction, it is off the classroom, any interaction will take place outside the classroom, that is what is going to help him because inside the classroom, it is a formal interaction, be the faculty you will be anywhere. So it's a formal interaction, whereas outside the classroom, if you're meeting idealism, the sportsfield ideal is when you're doing an activity, we're doing a club if you have the same interests, so that is why I started the sports. So, let us start. So that some kind of relationship outside the classroom is also established. And that is where that kind of thing will develop.(Ashwith)

Trust, openness and power of relationships.These are the core concepts of a mentor.First you must have trust in me that he's capable of mentoring me and you must believe that I possess the required skill to mentor you.The true mentor is to uplift you in different dimensions. Maybe it is the personal growth and professional growth in different dimensions.mentoring is bi directional.(Soumya)

All three participants viz.Arпита, Ashwith and Soumya are discussing the critical role of trust in a mentorship relationship between college faculty and students. The mentorship should cover all aspects of the student's life and there must be trust and respect between both parties for the

relationship to be effective. Trust is seen as the first step and can be increased through informal interactions outside the classroom. The importance of trust, openness, and relationships in mentorship is emphasized and a successful relationship requires trust and belief in the mentor's skills. A mentor should aim to help the mentee grow in multiple dimensions and the relationship should be a two-way learning experience.

Building and maintaining a mentoring relationship requires trust and respect, which is established through the mentor's professionalism, open communication, active listening, and friendly demeanor (Hudson, P. 2013). Additionally, trust and confidentiality are vital components for a successful mentoring relationship, allowing the mentee to openly share personal and career-related difficulties and aspirations with the mentor, who can then provide guidance and support. Confidentiality protects the private information and discussions between the mentor and mentee, increasing trust and making the mentee feel secure. Ensuring trust and confidentiality is crucial for the mentor to effectively guide the mentee towards their goals and professional growth. Mentor training can also positively impact the behavior of mentors and the activities they engage in with their mentees (Stelter, R. L. et al., 2021)

Theme 4: Physical and Mental Health

Do you think mentors are accountable for their mentee's physical and mental health?

Yes, 100%. Right, because everybody, every human being has a different strength, strength in the sense of how much pressure they can take.....As a mentor, it is my moral responsibility to understand mentee mental strength. And then at the other end, it is my moral responsibility to make her as well mentally strong, if she is not, but till that time to give that much pressure to the child which she can be you and I opt the Pareto strategy which boosts the potential of an individual So hence, about 90% 95% of the responsibility comes on a mentor for the physical and mental health of a child of a mentee.(Aachman)

Nobody can be accountable for anybody else's physical health and mental health. But yes, the person needs to know. Where do you stand in terms of your physical and mental health?.mentor can be the one who can be an interface..... But he's a very networked person.....I'm not the right person. So that's why we are getting you connected with the right person. That's called mentorship....Yeah, definitely the person has to see to the physical health and mental health if the person is not physically sound.Like the principle of this call, it says faculty members have to live with the students.Living with your students means understanding them on a daily basis.If the moment you decide that it is a mentor who can help me when your problem is solved, you have got the right mentor.(Moulik)

Yeah.To some extent, yes. To some extent, a mentor is not just who guides you in a professional degree in personal growth, if the student or the person has clearly said what he wants, what he's going through. But if a mentee is unable to handle that situation, then obviously it is the responsibility of a

mentor.to overcome this the guidance is required. That's where you need an expert as you need an experienced person.yes.They're responsible.(Aashritha)

Above Participants viz.,Aachman,Moulik and Aashritha highlight the significance of a mentor's understanding of their mentee's mental capacity and their responsibility for their physical and mental well-being. The mentor should aim to help the mentee become mentally strong and apply only the amount of pressure they can handle. The mentor has a moral responsibility to support their mentee in improving their well-being, and should act as a networked individual, connecting them with the right resources also suggests that a mentor should live with their mentee to better understand their daily struggles. Mentors should only be selected when the mentee is ready to address their problems and believes that a mentor plays a crucial role in guiding their mentee's professional and personal growth and has some responsibility for their physical and mental health. If the mentee experiences difficulties, the mentor should provide support and connect them with experienced individuals who can help.

The above findings are lined up with the Zone of Proximal Development concept, which considers both the physical and mental health of the mentee and the obligation of the mentor to monitor it. This leads to maximizing the mentee's potential and encouraging the acquisition of new skills and knowledge (Billingsley, J. T. et al., 2019). By operating within this zone,a mentor can aid the mentee in defining attainable goals, overcoming challenges, and developing new capabilities and understanding. This also involves attentive and empathetic listening, a genuine comprehension of the student's feelings, a positive outlook, and the establishment of a strong, supportive relationship. This method aligns with one of the participant's Pareto techniques, which is focused on boosting productivity and maximizing the individual's full potential (Wright, J. et al.,2018).

Theme 5: Short-term and Long-term Goals

Do mentors focus on short-term and long-term goal setting of mentees? How do you train your mentors to do so?

They are the people who can train students on setting up their people who can guide the students on setting up short term and long term goals. Long term goals are basically not putting the aspirations in a bigger term that you have.guidance is to be given by the mentors.Definitely, you have to work on short term goals and long term goals, long term goals can only be achieved if you gradually start achieving the short term goals one after the other, when you start completing them, you go closer to your final goal.(Daksh)

Short term goals lay the foundation for long term ones. Focus on the present and identify specific short term goals. For example, in the context of engineering education, immigration status may be a significant subject that needs to be addressed in the short term. As the mentor-mentee relationship grows stronger, long term goals can be achieved. Long term success depends on trust and the

willingness of the mentor to spend time with the mentee. Mentors should be trained in order to ensure a successful mentor-mentee relationship in a formal setting. This training will help the mentor to effectively work with the mentee and avoid common pitfalls.(Yuvraj)

.....short term, and long term goals are a part of mentoring. My personal opinion, you have your certain goal, and you share it with your mentor. And if he's capable of guiding you, if you take his expertise, his knowledge and is a good sender, not necessarily be the mentor, but mentor can always have a check whether the goal set by you is the realistic or non realistic, is it simple, not achievable, is really useful to you or not useful to you something.So fixing the short term and long term goals will not be necessarily by a mentor, it must be myself. But if you share it with your mentor, he may guide you and may suggest helping you but in my opinion.....(Pahel)

Above Participants Daksh,Yuvraj and Pahel discuss the role of mentors in guiding students to set short- and long-term goals. They emphasize the importance of starting with short term goals and gradually working towards long term goals, which require trust and a willingness to spend time with the mentor and mentions that mentors should be trained and that setting goals can be done by the individual but sharing them with a mentor can lead to guidance and suggestions. The opinions of the participants aligned with the GROW model, which places importance on the process of setting goals within the mentee's realm of attainable growth, fostering both their personal and professional advancement. The key to a successful mentoring relationship involves establishing trust, defining roles and responsibilities, setting both short-term and long-term goals, having open and supportive communication, and working together to resolve issues (Byington, T. 2010). The findings from the programs analyzed indicate that career development should be tailored to specific stages and have clear objectives. Programs that provide comprehensive career advancement from early education to academic careers are seen as offering long-term and sustainable career development (Buddeberg-Fischer, B. et al., 2006).

Theme 6: Effective Mentoring Program

Do you have any strategy for designing an effective mentoring program at institute mapping its vision and mission? Justify?

why only faculty should be mentors, why not students can be mentors. First you experience mentoring, and then you explain to them what experience you got out of mentoring. Your preparation is not full unless you have a mentor, you have someone who has gone through that who has seen that who has knowledge and that person can add better value to your effort.(Myra)

My strategy of making people think about it is to establish some good connection with the students not only for mentoring workers, but also to ensure that that transaction of learning happens. So, learning only can happen if the connection is their connection only can be established if people start understanding each other. So, that understanding comes only with genuine effort, if people don't put genuine effort and if they continuously grip on those strengths, don't reason with students like this, there

is no purpose. So, my attempt will be on that one that we will try to impact the details on treating this red cine in an appropriate way.(Soumya)

the student mentorship programme.a mentorship programme doesn't come with a mission as such, it depends on the mission of the students to be guided. Right, and everybody's mission and vision is different. Your aspirations are absolutely different from his.(Yuvraj)

Participants Myra and Soumya believe that mentorship is an essential aspect of personal growth and that having a mentor who has relevant experience and knowledge can add value to one's preparation. They aim to promote mentorship by building strong connections with students and emphasizing the need for genuine effort to establish an understanding between mentors and mentees. On the other hand, drawing on the prior experience in the armed forces, where peer mentorship has been a proven successful strategy, participant Yuvraj believes that this program can be an effective means of providing mentorship to students and proposes a student mentorship program that is tailored to meet the goals and aspirations of individual students seeking guidance.[47] The program focuses on identifying 10-15 mentors and mentees, comprising both faculty and students, in the field of engineering education, with a student-centric approach. The selection of potential mentors is done through a voluntary process, and the program aims to provide high-quality mentorship by offering appropriate technical guidance (Nieberding, R. J. 2007).Overall, compared to individuals who have an engineering background, those with a management or army background offered more comprehensive insights and opinions for the development of the student mentorship model.

The findings from the study are aligned with widely accepted methods and research from ZPD(Zone of the Proximal development) model study on enhancing mentor-mentee relationships (Santora, K. A. et al., 2013). This research lays the foundation for the development of a structured framework that outlines clear and distinct responsibilities for each role involved in creating a successful mentorship program. Notably, the framework incorporates all of the insights gathered from the participants to guarantee that it accurately represents their perspectives, taking into account all five constructs to shed light on the mentee's career in terms of placement opportunities or further education and overall skill growth and advancement.

TABLE II
Roles, Responsibilities and Activities in mentoring model

| Individuals | Responsibilities | Activities |
|-------------|------------------|------------|
|-------------|------------------|------------|

Chief mentors

- To quantify the aims and objectives of the program to accomplish a goal-oriented outcome
- Hold a foremost association with faculty mentors
- Maintain interaction with learners at all levels, either distinctly or in groups in accordance with the situation.
- Monitor mentors and mentees at various stages to ensure they are achieving their intended goals

program and the mentees' goals and objectives as they pertain to the same field of interest.

- Maintain contact with students' mentors and mentees, either individually or in small groups, to ensure that everyone is working to achieve their goals.

- To devise (create) and expound (communicate) the program's objectives to all levels of contributors.
- To initiate a variety of engaging and innovative methods to integrate and formulate everything to reach the desired goals
- Be accessible to all levels of mentors and mentees for queries.
- To hold regular discussions with all levels of contributors in order to gather feedback and analyze it in order to attain the desired results.

order to keep track of their association with their respective mentees

- Be approachable/ accessible to address all concerns from mentees and student mentors.
- To support the student mentors, extend out a helping hand if they encounter challenges and offer advice, practices, and methods on how to engage with their mentees more proficiently.

Student Mentors

- Identifying individual strengths and opportunities for meaningful work
- Planning and setting career-related goals.
- Inviting representatives from specific sectors to speak to young people about job possibilities and the specifics of working in their field.

- Periodically check out the things what are done by the students
- In building the trust of the freshmen
- Ice breaking and engaging themselves and students
- Plays a major role in taking the feedback from student
- Regularly keep the check in the progress of their mentees
- Analyzing the feedback and discuss the appropriate solutions or improvisations in the mentorship program

- Mentees**
- Reaching and sharing with their student mentors /connectivity and interaction with their student mentors.
 - To maintain the trust and confidentiality between them and student mentors /to uphold their relationship with student mentors' trust and discretion.
- To consistently engage in the process of learning.
 - Collaborate with your mentor to locate educational resources; pinpoint individuals and data that could be beneficial.
 - Keep the mentorship action plan updated and work with your mentor to establish objectives, growth opportunities, and deadlines.
-

VIII. CONCLUSION

In conclusion, this research on the Framing Mentorship Model from the perspective of engineering Educators emphasizes the importance of mentoring and also outlines the responsibilities and activities for each individual involved in establishing an effective mentorship program in engineering education in order to generate competent and socially responsible engineers who uphold moral and ethical values. The study presents a progressive mentoring framework based on data and observations gathered by experienced engineering educators and retired army officers explores the factors that influence the development and implementation of effective mentorship programs at engineering education institutions, including opinions on mentoring in undergraduate course, successful and failed mentoring elements, physical and mental health, skill development, goal-setting, trust, openness, and effective mentoring strategies between mentor and mentee. Individuals with a background in management and army shared more extensive insights and opinions compared to those with the engineering background. The mentoring strategy presented in the study can serve as a model for future implementation in engineering education institutions, and its effectiveness can be measured by periodically tracking the students' progress over a few years and emphasizes the importance of well-crafted mentorship initiatives in promoting the growth of students or mentees. The study affirms/concludes that mentoring programs plays a critical role in the career advancement of professionals and is particularly significant in higher education and it's effective implementation can have a direct impact on the success of both individual students and institutions as a whole.

VIII. FUTURE WORK AND LIMITATIONS

Future research will focus on analyzing the expert-proposed framework for implementation in the upcoming academic year, monitoring the responsibilities and activities of individual positions in progressive mentoring programs, and evaluating the effectiveness of mentoring throughout the engineering program in helping students achieve their future goals. The current study offers an overview of the engineering educators perception of the mentorship framework at the institution. Further research may include quantitative surveys of corporate professionals and

professors from various universities to gather different perspectives and incorporate them into the mentorship program, along with continuous evaluation and improvement through feedback. The goal of future work is to put into practice the framework developed at the conclusion of the study. Several studies focusing on students' perceptions of the implementation of the mentorship program at the institution could be conducted in future. Specifically, understanding the impact of the mentorship program on students' approaches to different aspects of their academic life will be worth investigating to evaluate the effectiveness of the program from the students' perspectives. Additionally, investigating the factors influencing the relationship between mentors and mentees, and how those relationships can be further strengthened is another potential direction for future work. To obtain a more comprehensive understanding of the subject, future studies should involve a larger sample size, utilize more in-depth ethnographic methods, and involve participation from a wider range of engineering faculty, using a diverse range of sources. This would lead to a greater amount of data and stronger patterns, allowing for the refinement of mentorship models. The mentoring process can be improved and made more effective through the involvement of both technical and academic mentors, ensuring that the protégés are able to meet their long- term and short-term goals, and eventually advance their careers through consistent skill-building.

IX. REFERENCES

- Hansman, C. A. (2002). Diversity and power in mentoring relationships. *Critical perspectives on mentoring: Trends and issues*, 39-48.
- Black, L. L., Suarez, E. C., & Medina, S. (2004). Helping students help themselves: Strategies for successful mentoring relationships. *Counselor Education and Supervision*, 44(1), 44-55.
- Reed, J., & Koliba, C. (1995). Facilitating reflection. *A manual for leaders and educators*.
- Thomas, K. M., Willis, L. A., & Davis, J. (2007). Mentoring minority graduate students: Issues and strategies for institutions, faculty, and students. *Equal Opportunities International*, 26(3), 178-192.
- McPartland, J. M., & Nettles, S. M. (1991). Using community adults as advocates or mentors for at-risk middle school students: A two-year evaluation of Project RAISE. *American journal of education*, 99(4), 568- 586.
- Schein, E. H. (1996). Career anchors revisited: Implications for career development in the 21st century. *Academy of management perspectives*, 10(4), 80-88.
- Mullen, C. A., & Klimaitis, C. C. (2021). Defining mentoring: a literature review of issues, types, and applications.

Annals of the New York Academy of Sciences, 1483(1), 19-35.

Jackson, V. A., Palepu, A., Szalacha, L., Caswell, C., Carr, P. L., & Inui, T. (2003). "Having the right chemistry": a qualitative study of mentoring in academic medicine. *Academic Medicine, 78(3), 328-334.*

Sng, J. H., Pei, Y., Toh, Y. P., Peh, T. Y., Neo, S. H., & Krishna, L. K. R. (2017). Mentoring relationships between senior physicians and junior doctors and/or medical students: a thematic review. *Medical Teacher, 39(8), 866-875.*

Sambunjak, D., Straus, S. E., & Marusic, A. (2010). A systematic review of qualitative research on the meaning and characteristics of mentoring in academic medicine. *Journal of general internal medicine, 25, 72-78.*

Clutterbuck, D. (2005). Establishing and maintaining mentoring relationships: An overview of mentor and mentee competencies. *SA journal of human resource management, 3(3), 2-9.*

Maruta, T., Rotz, P., & Peter, T. (2013). Setting up a structured laboratory mentoring programme. *African Journal of Laboratory Medicine, 2(1), 1-7.*

Gunn, F., Lee, S. H., & Steed, M. (2017). Student perceptions of benefits and challenges of peer mentoring programs: Divergent perspectives from mentors and mentees. *Marketing Education Review, 27(1), 15-26.*

Jackson, D. (2017). Developing pre-professional identity in undergraduates through work-integrated learning. *Higher Education, 74, 833-853.*

Klasen, N., & Clutterbuck, D. (2012). *Implementing mentoring schemes.* Routledge.

Goldner, L., & Ben-Eliyahu, A. (2021). Unpacking community-based youth mentoring relationships: An integrative review. *International journal of environmental research and public health, 18(11), 5666.*

Bozionelos, N. (2004). Mentoring provided: Relation to mentor's career success, personality, and mentoring received. *Journal of vocational behavior, 64(1), 24-46.*

Binani, S. (2022). Freshmen Engineering Students' Perspectives on Engineering Ethics—A Qualitative Study. *Journal of Engineering Education Transformations, 35(Special Issue 1)*

Ragins, B. R., & Kram, K. E. (2007). The roots and meaning of mentoring. *The handbook of mentoring at work: Theory, research, and practice, 3-15.*

Mullen, C. A., & Fletcher, S. J. (2012). *SAGE Handbook Of Mentoring and Coaching in Education: Responding to Challenging Circumstances.* SAGE Handbook of Mentoring And Coaching in Education, 1-568.

Carmel, R. G., & Paul, M. W. (2015). Mentoring and coaching in academia: Reflections on a mentoring/coaching relationship. *Policy Futures in Education, 13(4), 479-491.*

Lechuga, V. M. (2011). Faculty-graduate student mentoring relationships: Mentors' perceived roles and responsibilities. *Higher education, 62, 757-771.*

Chopra, V., Arora, V. M., & Saint, S. (2018). Will you be my mentor?—Four archetypes to help mentees succeed in academic medicine. *JAMA Internal Medicine, 178(2), 175-176.*

Binani, S. (2022). Development of Survey Instrument to Assess Freshmen Engineering Students Understanding on Engineering Ethics. *Journal of Engineering Education Transformations, 35(Special Issue 1)*

Kram, K. E., & Isabella, L. A. (1985). Mentoring alternatives: The role of peer relationships in career development. *Academy of management Journal, 28(1), 110-132.*

Murray, M. (1998). Mentoring is performance improvement. *Performance Improvement, 37, 35-39.*

Gibson, D. E., & Cordova, D. I. (1999). Women's and men's role models: The importance of exemplars. In *Mentoring dilemmas* (pp. 135-154). Psychology Press.

Douglas, C. A. (1997). *Formal Mentoring Programs in Organizations. An Annotated Bibliography.* Publication, Center for Creative Leadership, PO Box 26300, Greensboro, NC 27438-6300.

Bryant-Shanklin, M., & Brumage, N. W. (2011). Collaborative responsive education mentoring:

- Mentoring for professional development in Higher Education. *Florida Journal of Educational Administration & Policy*, 5(1), 42-53.
- Besterfield-Sacre, M., Atman, C. J., & Shuman, L. J. (1997). Characteristics of freshman engineering students: Models for determining student attrition in engineering. *Journal of Engineering Education*, 86(2), 139-149.
- Terrion, J. L., & Leonard, D. (2007). A taxonomy of the characteristics of student peer mentors in higher education: Findings from a literature review. *Mentoring & Tutoring*, 15(2), 149-164.
- Dockter, J., & Muller, C. (2003, December). Mentoring, Women in Engineering and Related Sciences, and MentorNet. In *AGU Fall Meeting Abstracts* (Vol. 2003, pp. ED22D-1253). Whitely, W., Dougherty, T. W., & Dreher, G. F. (1991).
- Kittur, J., Karway, G. K., Alrajhi, M. Z., Nelson, B. C., & Shin, S. (2021, July). Curriculum Design: Using the Five Discourses of Design Thinking. In *2021 ASEE Virtual Annual Conference Content Access*.
- Binani, S., Singh, T. A., & Shoeb, S. (2023). Freshmen Protégé Perspectives on Mentoring in Engineering Education-A Qualitative Study. *Journal of Engineering Education Transformations*, 36(Special Issue 2).
- Binani, S., Shoeb, S., & Singh, T. A. (2023). Development of Survey Instrument to Evaluate Freshmen Protégé Understanding on Mentoring in Engineering Education. *Journal of Engineering Education Transformations*, 36(Special Issue 2)
- Fletcher, S., & Mullen, C. A. (Eds.). (2012). *Sage handbook of mentoring and coaching in education*. Sage.
- Dunn, R. E., & Moody, J. R. (1995). Mentoring in the Academy: A Survey of Existing Programs.
- Byington, T. (2010). Keys to successful mentoring relationships. *Journal of Extension*, 48(6), 1-4.
- Straus, S. E., Johnson, M. O., Marquez, C., & Feldman, M. D. (2013). Characteristics of successful and failed mentoring relationships: a qualitative study across two academic health centers. *Academic medicine: journal of the Association of American Medical Colleges*, 88(1), 82.
- Hudson, P. (2013). Mentoring as professional development: 'growth for both' mentor and mentee. *Professional development in education*, 39(5), 771-783.
- Binani, S. (2022). Ethical Preparedness, Self-Efficacy and Challenges in Engineering Education—A Quantitative Study. *Journal of Engineering Education Transformations*, 35(Special Issue 1).
- Stelter, R. L., Kupersmidt, J. B., & Stump, K. N. (2021). Establishing effective STEM mentoring relationships through mentor training. *Annals of the New York Academy of Sciences*, 1483(1), 224-243.
- Billingsley, J. T., & Hurd, N. M. (2019). Discrimination, mental health and academic performance among underrepresented college students: the role of extracurricular activities at predominantly white institutions. *Social Psychology of Education*, 22, 421- 446.
- Wright, J., Gill, E., Bingaman, M., Mansperger, J., Morgan, A., & Ludy, M. J. (2018). Peer mentoring in college freshmen: Effects on physical and mental health.
- Byington, T. (2010). Keys to successful mentoring relationships. *Journal of Extension*, 48(6), 1-4.
- Buddeberg-Fischer, B., & Herta, K. D. (2006). Formal mentoring programmes for medical students and doctors—a review of the Medline literature. *Medical teacher*, 28(3), 248-257.
- Nieberding, R. J. (2007). *Effectiveness of the Army mentorship program*. US Army War College.
- Santora, K. A., Mason, E. J., & Sheahan, T. C. (2013). A model for progressive mentoring in science and engineering education and research. *Innovative Higher Education*, 38, 427-440.