Engineering Educators' Approach on Development of Mentorship Strategy at HITAM-A Qualitative Study

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Abstract : Mentoring plays a crucial role in fostering the success of all student demographics within engineering education. Particularly in the early stages of their careers, young engineers can significantly benefit from the guidance and encouragement provided by faculty mentors. Ensuring that engineers are adequately prepared, both academically and professionally, to enter the industry underscores the importance of enhancing undergraduate engineering colleges' perspectives on mentoring. This study delves into the perceptions of engineering educators at an autonomous institution in South India regarding mentorship programs in undergraduate education, employing a qualitative approach to assess their viewpoints. A questionnaire featuring open-ended questions was utilized to interview a total of 15 engineering educators. Analysis of the faculty responses yielded several prominent themes, including perceptions of mentoring in engineering education, essential components of successful mentoring, considerations of physical and mental well-being, skill enhancement, delineation of short and long-term objectives, fostering trust and openness in mentor-mentee relationships, and the formulation of effective mentoring strategies. The study also scrutinized variations in participant responses based on their educational backgrounds and prior involvement in mentoring initiatives. Aligned with the Zone of Proximal Development (ZPD) model, which posits that mentors play a crucial role in facilitating both personal and professional advancement, the research underscores the significance of mentors as valuable assets for mentees' growth. Additionally, the article examines the advantages and limitations associated with experienced engineers and educators serving as mentors for young engineers in practice.

The findings of this research are intended to serve as a guideline for engineering institutions seeking to establish successful and comprehensive mentoring programs that promote mentees' holistic development and career progression.

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

1. Introduction

With the introduction of mentoring initiatives in the 1970s mentoring programs swiftly became indispensable components of career advancement and personnel development in corporate, industrial, and governmental entities. These programs were

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primarily established to guarantee that individuals displaying potential for elevated roles consistently received mentorship to steer and oversee their career trajectories. (Hansman, C. A. 2002).

Recognized as a less structured form of connection, mentoring has been credited with aiding and integrating aspiring mentees by emphasizing their personal and professional growth. These mentor-mentee relationships prove advantageous for both students and mentors, contributing to the perpetuation of expertise within the profession as newer generations glean wisdom from seasoned mentors. (Black, L. L. et.al 2004).

This relationship is crucial and complex, fostering the development and achievement of individuals. Prior to embarking on the relationship, it's essential to ensure compatibility between the mentor and protégé. Challenges such as ineffective communication and ambiguous goals may arise, but they can be mitigated through introspection, transparent and non-judgmental dialogue, and the establishment of additional support systems. (Reed, J., & Koliba,C.1995). Despite its acknowledged benefits, mentoring remains underutilized and inadequately comprehended within the realm of undergraduate education. Many graduate students find themselves without mentoring relationships. (Thomas, K. M. et.al 2007). This discrepancy may stem from a lack of precise delineation of mentoring, ambiguity surrounding the roles of mentors and mentees, and a dearth of guidance on initiating mentoring connections. Consequently, there exists a disparity between the advocacy for mentoring and its practical application, notwithstanding its widely recognized benefits.(McPartland, J. M. et.al 1991) .

Mentoring is frequently lauded as a valuable means of providing support to individuals (Schein, E.H., 1996). The process of mentoring is characterized by its dynamic, fluid, and intricate nature, requiring time to develop. Establishing a mentoring relationship involves ongoing interaction and cannot be rushed. Over time, mentoring has been heralded as essential for educating and acquainting the next generation of professional counselors and counselor educators (Mullen, C.A. et al., 2021). The mentor-mentee dynamic evolves and matures through social interaction. It is widely believed that the success of mentoring relationships hinges not only on the mentor's skills and knowledge but also on the cultivation of both professional and personal connections (Jackson, V. A. et al., 2003). Therefore, implementing a systematic approach to mentoring and relationship development can aid mentors in fulfilling their roles effectively. The efficacy of a mentoring relationship is influenced by various factors, including the personal and professional attributes, capabilities, and methodologies of both the mentor and mentee, the context in which the relationship operates, and the selection and compatibility of the individuals involved (Sng, J. H. et al., 2017).

Several factors contribute to the significance of a successful mentoring relationship, including the personal and professional attributes, competencies, and practices of both the mentor and mentee, the context within which the relationship operates, and the selection and compatibility of individuals involved (Sambunjak, D. et al., 2010). The mentor-mentee dynamic evolves and matures through social interaction, necessitating not only the mentor's expertise but also the cultivation of both professional and personal bonds (Clutterbuck, D. et al., 2005). Employing a structured approach to mentoring and relationship establishment can assist mentors in their endeavors (Maruta, T. et al., 2013). The aim of this research is to develop a framework for fostering successful mentoring relationships that benefit both mentors and mentees while bolstering the continuity of the profession. This study seeks to construct a framework elucidating the intricacies and processes underlying the formation of successful mentoring relationships. It endeavors to delineate various types of mentoring relationships, ascertain the facilitating and inhibiting factors in their formation, and offer a novel, insightful conceptual framework. Through a general inductive approach, the study aims to uncover the attributes and traits conducive to successful mentoring relationships, as well as the barriers that may impede them. By longitudinally examining mentor-mentee interactions, the research endeavors to discern the components influencing their formation and shed light on factors contributing to their success or failure.

2. Literature

Numerous research studies have demonstrated that mentoring, in its diverse forms, yields various positive outcomes, including heightened productivity, enhanced professional and academic achievement, strengthened identity, improved job prospects, increased self-assurance, among others (Gunn, F. et al., 2017; Jackson, D. et al., 2017). Contemporary

literature on mentoring underscores its role as a reciprocal developmental relationship that fosters learning, growth, and advancement for both mentors and mentees (Klasen, N. et al., 2012). This encompasses direct benefits of mentorship programs as well as longer-term effects on career success and job satisfaction. While previous research has provided valuable insights into the short-term and long-term benefits of mentorship, fewer studies have explored the factors influencing the benefits for mentors. For instance, one study (Goldner, L. et al., 2021) found that mentors' perceptions of similarity with their mentees correlated with their evaluations of training quality and relationship satisfaction, even after accounting for factors like relationship duration and mentor gender.

Furthermore, mentoring contributes to the development of interpersonal skills and capabilities that enhance career outcomes, such as career progression, job satisfaction, and effectiveness, for both mentors and mentees (Binani, S. et al., 2022). Some literature suggests that clearly defined goals and performance standards can assist new leaders in adhering to ethical standards at the undergraduate level (Bozionelos, N. 2004). Experienced mentors proficient in translating leadership standards into practice play a crucial role in aiding new leaders to align their actions with stakeholders' objectives (Ragins, B. R. et al., 2007). Additionally, persistence and determination in pursuing goals often lead to higher levels of achievement (Mullen, C. A. et al., 2012).

The ideal mentor-mentee relationship should be grounded in elements such as respect, trust, understanding, and empathy (Binani, S., 2022). Mentors should exhibit active listening, problem-solving skills, and responsiveness to the mentee's needs, goals, and aspirations (Carmel, R. G. et al., 2015). Key elements of a successful mentoring relationship include its supportive nature aimed at helping mentees achieve their goals, addressing both career advancement and providing emotional support, benefiting both parties, emphasizing personal qualities such as honesty and effective communication, and leveraging the mentor's greater professional experience, influence, and success (Lechuga, V. M., 2011; Chopra, V. et al., 2018).

The establishment and pursuit of personal and professional development goals are crucial in facilitating the effective transfer of new knowledge in mentor-mentee relationships (Kram, K. E. et al., 1985). Mentoring is often defined as a deliberate pairing of a more experienced individual with a less experienced one, aimed at fostering the latter's growth and acquisition of specific skills (Murray, M., 1998). Mentors impart valuable insights into organizational customs, values, and norms, provide support, guidance, and advocacy, and offer feedback and information to aid mentees in achieving their objectives (Gibson, D. E. et al., 1999).

Some studies have highlighted ethical dilemmas faced by freshman engineering students when setting short- and long-term goals and acquiring necessary skills (Douglas, C. A., 1997). Mentors from corporate and government sectors can enhance students' awareness of post-graduate opportunities by sharing their career trajectories and providing insights on how coursework can be applied in professional settings. By setting goals and serving as experienced professionals who offer clear guidance and frameworks for analyzing and understanding career aspirations, career mentors support mentees' advancement within organizations or fields of interest (Bryant-Shanklin, M. et al., 2011). Additionally, to address high retention rates among first-year students, educational institutions have implemented various mentorship programs tailored to freshmen (Besterfield-Sacre, M. et al., 1997). The significance of mentorship in education lies in mentors' ability to provide mentees with insights about their professional paths, offer guidance, inspire, provide emotional support, and serve as role models (Terrion, J. L. et al., 2007).

Despite its well-documented benefits, mentoring relationships remain underutilized and inadequately understood in engineering education (Dockter, J. et al., 2003). This gap can be attributed to the lack of a clear definition of mentoring, uncertainties surrounding the roles and responsibilities of mentors and mentees, and a dearth of guidance on initiating mentoring relationships (Whitely, W. et al., 1991). To bridge this disparity, this study aims to identify various types of mentoring relationships, discern factors supporting or hindering their formation, and propose a new and insightful conceptual framework. Employing a general inductive approach, the research seeks to identify traits and characteristics conducive to successful mentoring relationships, as well as factors that may impede them. By longitudinally tracking mentor-mentee interactions, the study aims to provide insights into factors contributing to the success or failure of such relationships. As part of this

study, we develop a framework to assess experienced faculty members' opinions on mentorship in engineering education.

3. Methods

A qualitative research methodology was employed to explore professionals' perceptions of mentoring within an engineering institute. A total of 26 mentoring design experts were purposively selected from HITAM, an autonomous institute in India, based on their diverse backgrounds in management and technical expertise. Initial contact with these individuals was established via email, and upon receiving study details, interviews were scheduled. A questionnaire focusing on the five constructs of mentoring was devised and rigorously reviewed by the research team prior to the interviews. Conducted in person, the interviews lasted between 20 to 40 minutes, were recorded, transcribed, and subsequently coded. The coded data underwent analysis using a deductive approach, leading to the identification of three overarching themes: the fusion of education and mentoring, the five constraints, and recommendations for mentors regarding their mentoring strategies. Additionally, the participants' perspectives and viewpoints on the mentoring program were elucidated.

4. Qualitative Analysis

Qualitative Comparative Analysis was employed to evaluate the outcomes of various mentorship techniques, ensuring a comprehensive review of the transcribed interviews to capture all relevant information. A team of four undergraduate students collaborated to assess the presence or absence of elements within the five constructs of the mentoring model. Utilizing deductive coding, predetermined codes and themes were applied to the qualitative data extracted from the interview transcripts. The five constructs, namely the role of mentoring, physical and mental health, trust and confidentiality, goal setting, and skill development, emerged as the primary themes in the study. Each student was tasked with analyzing one interview, presenting examples provided by the interviewee pertaining to the five constructs of mentoring. Subsequently, the remaining two students reviewed the analysis and offered feedback for potential revisions. This iterative process was repeated for all 15 interviews, with each student assuming a lead role for one interview and serving as a reviewer for others. Furthermore, the analysis delved

into the interviewees' perspectives on defining education through mentoring, the significance of integrating education and mentoring, and their comprehension of mentoring. The conclusion of the analysis synthesized recommendations for developing an effective mentoring approach conducive to positive outcomes (Kittur, J. et al., 2021).

5. Procedures

Interviewees were selected based on their extensive experience in mentoring and related projects, ensuring a diverse range of perspectives. Contact was initiated through email, where participants were informed about the research study as part of the prior consent process, and their involvement was voluntary (Binani, S. et al., 2022). A total of fifteen semi-structured interviews were conducted, focusing primarily on perceptions related to the use of five key constructs of mentoring: opinions on mentoring in engineering education, elements of successful mentoring, considerations of physical and mental well-being, skill development, defining short and long-term goals, and trust and confidentiality in the mentor-mentee relationship. Additionally, the interviews explored each participant's interpretation of education through mentoring. The interview questions are provided in the appendix (Binani, S. et al., 2022).

6. Participants

The interview participants comprise a leadership team from an engineering institution, all possessing extensive expertise in mentoring students at various career stages. A total of 15 participants were recruited, and the table provided below outlines their demographic information.

Table 1 : 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

7. Results And Analysis

This section presents qualitative data in the form of open-ended survey questions, along with the emergence of themes derived from the questionnaire. Furthermore, the participants' perceptions and understanding of each theme are described.

Theme1: Perceptions about mentoring in engineering education

How do you define mentoring within the context of 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 marketplace 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)

Dhruv, Shrayan, and Myra displayed a favorable outlook on mentoring in engineering education. They emphasized the importance of mentors establishing an emotional connection and showing genuine involvement in the mentee's journey. They value the mentee as an individual and strive to guide them in the right direction. Additionally, they prioritize active listening and assisting the mentee in solving their own problems rather than simply providing direction. Their ultimate aim is to foster the development of the mentee into a well-rounded professional.

The involvement of mentors in engineering institutions plays a pivotal role in enhancing skills, facilitating better decision-making, and offering fresh perspectives on life and career paths. Mentors motivate their mentees to realize their full potential and extend opportunities to broaden their professional networks and advance in their careers (Fletcher, S. et al., 2012). Additionally, mentors serve as exemplary figures, guiding mentees in the development of leadership, research, service, and teaching abilities. Through mentoring relationships, a sense of community is fostered, contributing to increased self-confidence, self-worth, and motivation. In summary, mentoring equips engineering students with essential skills, knowledge, and practical experience necessary for a successful career (Dunn, R. E. et al., 1995).

Theme 2: Elements of Mentoring Relationship

How do you view the components of a successful mentoring relationship, as opposed to those of an unsuccessful one, and what impact do they have on the 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)

Prisha, Pahel, and Kiansh demonstrated a positive stance on the significance of successful mentoring relationships. They emphasized that the frequency of interaction is crucial for nurturing the relationship, leading to emotional and intellectual benefits. They highlighted the importance of trust, proximity, closeness, and bonding in fostering a successful mentor-mentee dynamic within a mentorship program. They underscored that ownership, commitment, and responsibility are essential elements for the success of such relationships. Furthermore, they emphasized the importance of empathy and a genuine desire to provide support as key qualities for effective mentors. Additionally, they highlighted the importance of being a good listener, a supportive friend, and possessing strong leadership and communication skills. Overall, they emphasized that being a successful mentor requires being a good person.

The findings align with conclusions drawn from literature, emphasizing the key factors for establishing a successful mentoring relationship: fostering trust, defining roles and responsibilities, setting clear goals, promoting open communication, and collaborating to solve problems (Byington, T. 2010). While relationships are fundamental to mentoring, mentors may lack professional development in building these relationships, impacting their self-efficacy and ethical preparedness in academic settings (Binani, S. 2022). Mentorship programs demonstrate the positive impact of cultivating and maintaining relationships, highlighting mentors' role in supporting mentees' development (Straus, S. E. et al., 2013). Successful mentorship is crucial for the career satisfaction and success of both mentors and mentees, yet challenges persist in providing effective mentorship to faculty members (Hudson, P. 2013).

Theme 3: Trust, Openness and Power of relationships

What is your perspective on how factors such as trust, openness, and power dynamics should manifest 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)

Arpita, Ashwith, and Soumya are engaging in a discussion about the pivotal role of trust in mentorship relationships between college faculty and students. They emphasize that mentorship should encompass all facets of a student's life and necessitate trust and respect between both parties for its effectiveness. Trust is identified as the foundational element, which can be nurtured through informal interactions beyond the classroom. They underscore the significance of trust, openness, and relational dynamics in mentorship, emphasizing that a successful relationship hinges on trust in the mentor's expertise. Mentors are encouraged to facilitate holistic growth in mentees, fostering a mutually beneficial 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

In your opinion, are mentors responsible for the physical and mental well-being of their mentees?

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'rresponsible (Aashritha)

Aachman, Moulik, and Aashritha underscore the importance of mentors understanding their mentees' mental capacities and their accountability for their physical and mental well-being. Mentors should strive to assist mentees in developing mental resilience and apply pressure only within manageable limits. They have a moral obligation to support mentees in enhancing their well-being and act as connectors, facilitating access to appropriate resources. Additionally, they suggest that mentors should immerse themselves in mentees' lives to comprehend their daily challenges better. Mentors should be chosen when mentees are prepared to address their issues, recognizing mentors' pivotal role in guiding both professional and personal growth, including some responsibility for mentees' physical and mental health. In times of difficulty, mentors should offer assistance and connect mentees with experienced individuals who can provide further support.

The aforementioned findings correspond with the Zone of Proximal Development concept, which underscores the mentor's responsibility for both the physical and mental well-being of the mentee, aiming to optimize their potential and foster the acquisition of new skills and knowledge (Billingsley, J. T. et al., 2019). Operating within this zone enables mentors to assist mentees in setting achievable goals, overcoming obstacles, and cultivating new capabilities and insights. This approach entails attentive and empathetic listening, genuine understanding of the mentee's emotions, fostering a positive outlook, and establishing a supportive relationship. This approach resonates with one participant's Pareto technique, which emphasizes enhancing productivity and maximizing individual potential (Wright, J. et al., 2018).

Theme 5: Short-term and Long-term Goals

Do mentors address both short-term and long-term goal setting with their mentees? How do you prepare mentors to facilitate this process?

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)

Daksh, Yuvraj, and Pahel delve into the mentor's role in assisting students in establishing short- and long-term objectives. They stress the significance of commencing with short-term goals and progressively transitioning to long-term aspirations, underscoring the necessity for trust and a willingness to invest time with the mentor. Furthermore, they advocate for mentor training and highlight that while individuals can set goals independently, sharing them with a mentor can facilitate guidance and suggestions.

The viewpoints expressed by the participants align with the GROW model, emphasizing the importance of goal-setting within the mentee's attainable growth trajectory, thereby fostering their personal and professional progression. A successful mentoring relationship is characterized by elements such as trust-building, defining roles and responsibilities, establishing both short-term and long-term goals, fostering open and supportive communication, and collaboratively addressing challenges (Byington, T. 2010). The findings gleaned from the analyzed programs underscore the need for tailored career development initiatives with clear objectives at different stages. Programs that offer comprehensive career advancement, spanning from early education to academic careers, are perceived as facilitating long-term and sustainable career growth (Buddeberg-Fischer, B. et al., 2006).

Theme 6: Effective Mentoring Program

Could you outline a strategy for developing a successful mentoring program at HITAM that aligns with its vision and mission? Please provide reasoning for your approach.

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)

Myra and Soumya advocate for the essential role of mentorship in personal growth, emphasizing the value that mentors with relevant experience and

knowledge bring to one's preparation. They aim to foster mentorship by cultivating strong connections with students and stressing the importance of genuine effort in establishing understanding between mentors and mentees. Conversely, drawing from prior experience in the armed forces where peer mentorship has proven successful, Yuvraj suggests implementing a student mentorship program tailored to individual students' goals and aspirations. This program, focusing on engineering education, aims to identify 10-15 mentors and mentees, including both faculty and students, with a student-centric approach. Potential mentors are selected voluntarily, with the program striving to provide high-quality mentorship through appropriate technical guidance (Nieberding, R. J. 2007). Overall, individuals with a management or army background offer more comprehensive insights and opinions compared to those with an engineering background for the development of the student mentorship model.

The study's findings are consistent with established methodologies and research, particularly drawing from the Zone of Proximal Development (ZPD) model, which examines ways to enhance mentor-mentee relationships (Santora, K. A. et al., 2013). This research serves as the groundwork for structuring a framework that delineates clear and defined responsibilities for each role involved in establishing a successful mentorship program. Importantly, the framework integrates insights gathered from participants to ensure an accurate representation of their perspectives, encompassing all five constructs. This comprehensive approach aims to illuminate various aspects of the mentee's career path, including placement opportunities, further education, and overall skill growth and development.

8. 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 Furthermore, exploring the dynamics and enhancement of relationships between mentors and mentees presents an avenue for future research. To achieve a more comprehensive understanding of the topic, future studies could incorporate a larger sample size, employ deeper ethnographic methodologies, and engage a broader spectrum of engineering faculty, drawing from diverse sources. This approach would yield richer data and more robust patterns, facilitating the refinement of mentorship models.

Improving the mentoring process involves the inclusion of both technical and academic mentors, ensuring that mentees can effectively pursue their short-term and long-term goals while advancing their careers through continuous skill development.

9. Conclusion

In conclusion, this research delves into the development of a mentorship model within engineering education, focusing on various aspects such as data sources, key factors explored, diverse perspectives, proposed mentorship framework, measurement of effectiveness, and significance in higher education. It underscores the crucial role of mentoring in nurturing competent and socially responsible engineers who uphold ethical values.

The study presents a comprehensive mentorship framework derived from insights gathered by experienced engineering educators and retired army officers. It examines factors influencing the establishment of effective mentorship programs in engineering institutions, including opinions on mentoring, elements of successful and failed mentoring, physical and mental health considerations, skill development, goal-setting, trust, openness, and effective mentoring strategies.

Participants with backgrounds in management and the military contributed broader insights compared to those with engineering backgrounds. The proposed mentorship strategy serves as a blueprint for future implementation in engineering education institutions. Its effectiveness can be assessed by monitoring students' progress over time, highlighting the importance of well-structured mentorship initiatives in fostering student growth.

Ultimately, the study confirms that mentorship programs are pivotal for professionals' career advancement, particularly in higher education Effective implementation can significantly impact both individual students and institutions, emphasizing the vital role of mentorship in driving success at all levels.

Relationship between mentors and men 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.

10. Recommendations

In light of the research findings, several recommendations can be made to enhance the effectiveness of the mentorship program within the engineering institute. Firstly, engaging both technical experts and academic mentors in the program offers a holistic development experience for mentees, combining practical industry knowledge with academic guidance. Secondly, the program should prioritize skill-building, providing opportunities for mentees to acquire and hone essential skills relevant to both their immediate academic pursuits and long-term career growth.

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