Chapter 3

Research Methodology

3.1 Introduction

This chapter outlines research methodology, which is divided into three primary sections: research gap, research design, and research implementation. Crotty defines research methodology as "the strategy, plan of action, process, or design that lies behind the choosing and use of certain methodologies and links the choice and use of methods to the desired outcomes." Planning and carrying out research in a methodical way is the aim of research methodology, which also aims to ascertain the rationale behind the selection of particular research approaches and methodologies. The study framework, research design, sample information, data collection instruments, questionnaire formulation, validity and reliability, and a brief overview of the analysis techniques used in the next chapter are all covered in this chapter.

The primary goal of this empirical research is to assess the effectiveness of mentoring programs and explore how mentors' roles, functions, and abilities influence mentees' experiences and perceptions. A key aspect of the study involves identifying and understanding the expectations that mentees have regarding their mentors' responsibilities and skill sets. By addressing these dimensions, the research aims not only to enhance the practical implementation of mentoring programs within organizations but also to contribute valuable insights to the broader academic discourse on mentoring practices.

This study seeks to bridge the gap between theory and practice by providing a comprehensive understanding of the factors that drive successful mentoring relationships. By analyzing the expectations and experiences of mentees, the research sheds light on the dynamic interplay between mentor competencies and mentee development. Such findings are expected to inform strategies for designing mentoring programs that foster professional growth, enhance organizational outcomes, and support mentees in achieving their goals. By detailing the methodological choices, this section establishes the foundation for a rigorous exploration of the research objectives, ensuring that the findings are both reliable and actionable.

3.2 Research Process

In order to guarantee efficient and customized matching, the research process for creating a mentor-mentee recommendation system consists of several steps. Data on mentors and mentees, such as their abilities, backgrounds, objectives, passions, and preferences, must first be gathered and examined. This information is frequently gathered via surveys, profiles, or past exchanges. The system is further optimized for dynamic and effective mentor-mentee relationships through ongoing modification based on feedback, changing user needs, and technological advancements.

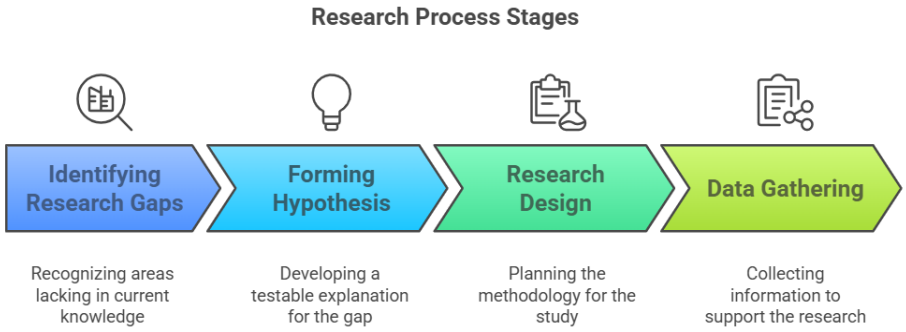

Figure 3. 1: Research Process

3.2.1 Stage 1: Research Problem / identifying the research gaps

The foundation of any successful research effort is the identification of the research problem. By outlining the study's objectives, direction, and scope, it establishes the framework for the entire research process. This crucial initial phase guarantees that the study fills a major gap or problem in the selected field and is both doable and pertinent.

3.2.1.1 The Value of Determining the Research Gap

The research challenge serves as the study's compass, pointing the investigator in the direction of significant goals and conclusions. The research has the risk of being irrelevant, redundant, or lacking focus if the problem is not well defined. Finding the issue guarantees:

- **Clarity and Direction:** It outlines the goals of the study as well as the topics it aims to address.
- **Significance:** By illustrating how the study tackles an unmet need or unsolved problem, it draws attention to how important it is.

- **Feasibility:** It aids the researcher in determining whether the issue can be resolved given the time, money, and methodological limitations at hand.

3.2.1.2 Identified Research Gaps

Mentoring has long been recognized as a vital support mechanism in personal and professional development. However, in many areas, the absence of structured mentoring processes has left significant challenges unresolved. Individuals' growth and well-being have been greatly impacted by the key challenges that have gone unresolved due to the absence of formal mentorship in academic, professional, and personal development contexts. The lack of specialized assistance in negotiating challenging educational and employment choices is one major problem. People are frequently left to make important decisions without the benefit of experience or context when mentors are not available to offer insights, counsel, and support.

Higher rates of academic dropout, career dissatisfaction, and lost possibilities for professional growth result from this. A significant weakness in the current support systems is highlighted by the fact that many students and young professionals suffer from self-doubt, uncertainty about their objectives, and an incapacity to realize their full potential.

Furthermore, those who work in high-pressure workplaces experience deteriorating mental and emotional health as a result of a lack of mentoring. According to studies, mentoring protects against stress and burnout by fostering emotional stability, resilience, and confidence. But without it, workers and students often suffer from sadness, loneliness, and anxiety since they don't have a solid support network. For example, students frequently struggle to adjust to demanding academic standards and personal transformations in academic environments. Without guidance, this can lead to feelings of loneliness and subpar performance. This unfulfilled need for individualized counseling emphasizes how crucial it is to incorporate mentoring frameworks in order to successfully treat these widespread and crippling problems.

3.2.1.3 Hypothesis

A specific, testable assertion or prediction regarding the link between two or more variables in a research setting is called a hypothesis. It provides precise and quantifiable goals,

directing the research process and acting as a basis for empirical inquiry. A hypothesis in mentoring research can examine the relative advantages of formal vs informal mentoring programs, the impact of gender on mentor-protégé dynamics, or the efficacy of mentoring relationships.

After determining the research problem and carrying out an exhaustive literature review, a hypothesis is usually developed. It is designed to fill in particular knowledge gaps or unanswered questions. For instance, hypotheses in mentoring studies frequently seek to assess whether particular mentoring functions—like career assistance or psychological guidance—produce quantifiable results, such as increased protégé satisfaction or professional progress.

3.2.1.4 Hypotheses' Function in Research Mentoring

- **Comprehending Mentor-Protégé Dynamics:** Theories can examine how factors like gender, age, or experience affect the caliber of mentoring relationships.
- **Program Effectiveness Evaluation:** Hypotheses enable methodical comparisons, for example, between formal and informal mentoring, to ascertain which strategy produces superior results.
- **Examining Career Outcomes:** Theories can look into how mentoring affects observable career indicators like work satisfaction, skill growth, or promotions.
- **Evaluating Psychosocial Benefits:** Researchers can confirm the wider influence of mentoring beyond career advancement by speculating about connections between mentoring and emotional health.

3.2.1.5 Formation of Hypothesis

Hypothesis 1: No Substantial Difference between Female and Male Protégés in Career and Psychosocial Functions

This hypothesis posits that gender does not play a significant role in determining the effectiveness of mentoring in terms of career and psychosocial functions for protégés. Career functions include tangible benefits like promotions and networking opportunities, while psychosocial functions focus on emotional support and confidence-building. The hypothesis challenges traditional gender stereotypes by suggesting that male and female

protégés derive similar levels of career and psychosocial benefits from mentoring relationships.

Hypothesis 2:

No Substantial Difference between Female and Male Mentors in Career and Psychosocial Functions

This hypothesis examines whether mentors' gender influences their ability to provide career and psychosocial support. It suggests that male and female mentors are equally effective in offering guidance, emotional support, and career advancement opportunities. By addressing this question, the hypothesis explores the universality of mentoring competencies, regardless of the mentor's gender, and contributes to understanding the dynamics of diverse mentoring relationships.

Hypothesis 3: No Substantial Difference between Informal and Formal Mentoring Programs in Professional and Psychosocial Functions

This hypothesis compares the effectiveness of informal versus formal mentoring programs in delivering professional development and psychosocial benefits. Formal programs are structured and organized by institutions, while informal mentoring develops naturally through personal connections. The hypothesis suggests that both types of programs are equally effective in fostering career growth and providing emotional support, challenging the assumption that structured programs have a distinct advantage.

Hypothesis 4: No Substantial Difference between Informal and Formal Mentoring Programs in Factors Influencing Career Development

Here, the focus is on the factors that influence career development, such as networking opportunities, skill enhancement, and professional exposure. This hypothesis posits that the format of mentoring—whether informal or formal—does not significantly affect these factors. It highlights the potential equivalence of both approaches in shaping protégés' career trajectories and addressing their professional aspirations.

Hypothesis 5: No Substantial Difference between Female and Male Protégés in Factors Influencing Career Growth

This hypothesis investigates whether male and female protégés experience similar factors influencing their career growth within mentoring relationships. Factors like mentoring quality, access to opportunities, and personal initiative are analyzed to determine whether gender creates disparities. The hypothesis aims to identify if career growth outcomes are influenced by gender or are universally achievable through effective mentoring.

Hypothesis 6: No Substantial Difference between Informal and Formal Mentoring Programs in Protégé Satisfaction with a Mentor

Protégé satisfaction is critical for evaluating mentoring success. This hypothesis suggests that the nature of the mentoring relationship—formal or informal—does not significantly impact the protégé's satisfaction with their mentor. It challenges the notion that formal programs, with their predefined goals and structure, are inherently better at meeting protégés' expectations and needs.

Hypothesis 7: No Substantial Difference between Informal and Formal Mentoring Programs in Protégé Satisfaction with Career Advancement

This hypothesis expands on satisfaction metrics by focusing on career advancement. It posits that protégés participating in informal and formal mentoring programs report similar levels of satisfaction regarding their career progress. The hypothesis underscores the idea that the structure of the program may not be as critical as the quality of the mentoring relationship.

Hypothesis 8: No Substantial Difference between Female and Male Mentors in Protégés' Career Paths and Promotions

This hypothesis addresses whether the gender of the mentor impacts the career trajectories and promotion opportunities of protégés. It suggests that male and female mentors are equally capable of influencing their protégés' success in achieving career milestones. This challenges any inherent biases or assumptions about the differing capabilities of mentors based on gender.

Hypothesis 9: No Substantial Difference between Female and Male Mentors in Protégé Contentment with a Mentor

Protégé contentment reflects their overall satisfaction and trust in the mentoring relationship. This hypothesis asserts that a mentor's gender does not significantly affect the protégé's satisfaction level. It emphasizes that mentoring effectiveness is more likely tied to individual qualities and behaviors than to gender-specific traits.

Hypothesis 10: No Linear Relationship between Career Functions and Psychosocial Functions

This hypothesis examines the relationship between career and psychosocial functions, suggesting that they do not follow a straightforward linear correlation. While career functions focus on tangible benefits like promotions, psychosocial functions address emotional and interpersonal support. The hypothesis challenges the assumption that these two aspects must progress in tandem, allowing for nuanced exploration of their interplay.

Hypothesis 11: No Linear Relationship between Mentoring Functions and Career Growth

This hypothesis argues that the relationship between mentoring functions—career and psychosocial—and career growth is not strictly linear. It suggests that career growth may be influenced by multiple variables, such as the protégé's motivation and external opportunities, rather than solely by the quality of mentoring. This perspective broadens the understanding of how mentoring impacts career outcomes.

Hypothesis 12: Mentoring Duties Have No Discernible Effect on Protégés' Career Advancement

This hypothesis challenges the fundamental assumption that mentoring responsibilities directly influence career advancement. By positing that mentoring duties do not have a measurable impact, it raises questions about the effectiveness of traditional mentoring roles. This hypothesis invites exploration of alternative factors or approaches that might drive career progress, encouraging a more critical evaluation of mentoring practices.

3.2.2 Stage 2: Research Design

One essential element of the entire research approach is the research design. It acts as a guide for carrying out the investigation, detailing the techniques, steps, and tactics that will be used to address the research questions or evaluate hypotheses. When it comes to mentoring research, the research design is crucial in deciding how to examine the dynamics

of mentor-mentee relationships, the efficacy of various mentoring philosophies, and their effects on protégés' psychosocial and professional growth.

Carefully choosing the study type, data gathering strategies, and data analysis procedures are all part of the research design for the mentoring process. This guarantees that the study is methodical, well-structured, and able to produce accurate and trustworthy findings.

3.2.2.1 Data Gatherings

Data collection is an essential phase in studies on mentor-mentee interactions in order to comprehend the preferences, objectives, communication styles, and other elements that affect how successful the mentoring process is. Accurate and pertinent data collection is crucial for successfully matching mentors and mentees. The techniques used to collect the data must guarantee that the information is thorough, objective, and uniform among the participants (mentors and mentees).

The following data collection methods are employed to get answers from mentors and mentees:

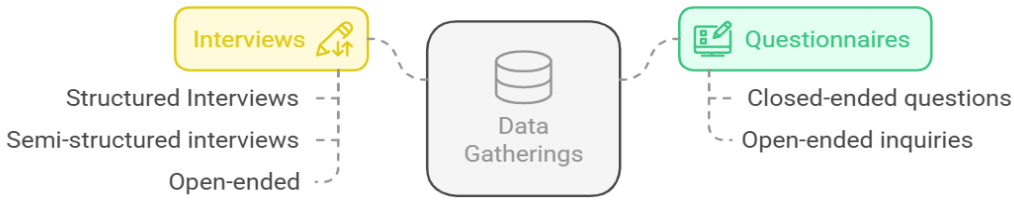

Figure 3. 2: Data Gathering Methods

- **Questionnaires:** One of the most popular ways to get information from mentors and mentees is through surveys and questionnaires. They can be customized to record both qualitative and quantitative data and enable organized data collection.

Closed-ended questions: These questions have predetermined, easily quantifiable answers (e.g., multiple-choice, Yes/No, Likert scales). For instance, "Do you prefer in-person meetings?" (Yes/No), or "How important do you think career guidance is on a scale of 1 to 5?"

Open-ended inquiries: The mentor or mentee might respond in-depth and in their own words to these questions. "What are your goals for the mentorship program?" is one

example. or "What abilities do you hope this mentoring relationship will help you develop?"

- **Benefits**

Scalability: Surveys are effective for collecting data from a broad range of participants since they are simple to distribute to a sizable number of mentors and mentees.

Structured Data: Quantitative metrics (such average ratings, match scores, etc.) can be computed from the easily analyzed answers to closed-ended questions.

Flexibility: Because surveys can be administered in-person or online, they can be used in a variety of settings.

- **Interviews:** Compared to surveys, interviews enable more thorough data collecting and offer deeper qualitative insights. They can be unstructured (open-ended, more conversational), semi-structured (a combination of fixed and open questions), or structured (with predetermined questions).

Structured Interviews: The interviewer uses a pre-planned list of questions in a structured interview. By ensuring that everyone answers the identical questions, this method facilitates response comparison.

Semi-structured interviews: Offer flexibility by enabling the interviewer to pose follow-up questions in response to the interviewee's responses. This is perfect if you want to learn more about the expectations, values, and motives of both mentors and mentees.

Open-ended: This approach is employed when the researcher wants to comprehend the individual experiences, difficulties, and objectives of the participants.

- **Benefits:**

Comprehensive comprehension: Interviews can provide more in-depth information about individual experiences, expectations, and difficulties that may not be included in surveys.

Developing rapport: Interviews provide a chance to gain participants' trust, which may encourage them to be more forthright and honest.

3.3 Mentoring software and online platforms

In the current digital era, a lot of mentoring organizations manage mentor-mentee connections through online platforms or mentoring software. Data on the preferences,

interactions, and happiness of mentors and mentees can also be collected using these platforms.

3.3.1 Procedure

On the site, users complete their profiles by providing information about their availability, preferences, ambitions, and abilities. Through the platform's interface, data is automatically collected and processed to produce insights or suggest connections between mentors and mentees. Additionally, interactions (such messages sent and meetings) and satisfaction metrics (like goal progress and feedback ratings) may be tracked by the platform.

3.3.2 Benefits

- **Efficiency:** Both mentors and mentees save time because data is gathered automatically.
- **Constant Monitoring:** The platform makes it possible to gather data continuously, which may be used to evaluate how well the mentoring relationship is working.

3.3.3 Categories of Questionnaires

In this research, a set of structured questionnaires will be designed to collect comprehensive data from both mentors and mentees. These questionnaires will be divided into eight categories, each focusing on a specific aspect of the mentor-mentee relationship and individual traits, which are crucial for successful pairing. The data collected from these responses will help build meaningful and effective mentor-mentee matches.

Here's a detailed breakdown of each category in the questionnaire:

Table 3. 1: Categories of Questions

Sr. No.	Category Name
1	Basics of Life -5
2	Nature - 5
3	About your feelings - 5
4	Empathy - 5
5	Relationships - 5

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6	About your thinking - 5
7	Rating - 5
8	Case studies - 15

3.3.3.1 Basics of Life (5 Questions)

This category aims to understand the fundamental lifestyle and personality traits of both mentors and mentees. It will explore their basic preferences, values, and general life approaches, providing an overview of their day-to-day approach to life. These questions will help match individuals based on foundational values such as work-life balance, commitment to personal growth, and overall life philosophy.

Example questions:

“What is your age range?”, “Do you love music?”, “Do you skip meals?”.

By gaining an understanding of lifestyle choices and values, mentors and mentees can find areas of agreement and match their approaches to life, which is crucial for developing a healthy mentoring relationship.

3.3.3.2 Nature (5 Questions)

The opinions and attitudes of the respondents toward sustainability, the environment, and nature are examined in this category. It assists in determining an individual's level of environmental consciousness as well as if their hobbies or way of life are in line with outdoor pursuits, environmental issues, or eco-friendly behaviors.

Example Questions:

“Do you react violently when angry?”, “Do you socialize?”, “Do you react violently when angry?”

A more harmonious relationship can result from matching mentors and mentees who have similar ideals regarding nature, particularly if one or both of them are enthusiastic about outdoor recreation or environmental sustainability.

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3.3.3.3 About your feelings (5 Questions)

The emotional intelligence and self-awareness of mentors and mentees are evaluated in this area. It looks at how people interpret and communicate their feelings as well as how they respond to different emotional circumstances. This is essential for connecting people who can relate to and communicate with each other.

Example questions:

“How would you describe your happiness?”, “How often do you cry?”, “How often do you get angry?”

The emotional compatibility of mentors and mentees will be ascertained with the aid of this part. An effective mentoring relationship requires improved communication and understanding, which can be fostered by emotional alignment.

3.3.3.4 Empathy (5 Questions)

A fundamental component of any mentoring relationship is empathy. This area will assist in determining the degree of empathy a mentor or mentee exhibits as well as their propensity to listen to and assist others along their path. Mentors must have empathy in order to comprehend the difficulties mentees encounter and provide insightful counsel and direction.

Example Questions:

“How often do you take risks for the sake of others?”, “How often do you enjoy caring for others?”, “How often do you feel irritable or unhappy for no reason?”

This category is intended to evaluate the emotional connection between mentors and mentees in order to create a nurturing atmosphere. A high degree of empathy can improve the mentoring process and increase the effectiveness and significance of the connection.

3.3.3.5 Relationships (5 Questions)

Individuals' perspectives on relationships, including interpersonal skills, trust-building, and a sustained dedication to creating meaningful connections, are the main focus of this

category. In order to ensure that both mentors and mentees can communicate effectively and gradually develop trust, it is helpful to understand the expectations of both in partnerships.

Example Questions:

“Do you socialize?”, “What bothers you the most?”, “Why do you think you're always left out?”

The purpose of this part is to make sure that mentees and mentors have comparable expectations for their connection. It's critical to evaluate compatibility early on because inaccuracy in this area might lead to annoyances or misunderstandings.

3.3.3.6 About Your Thinking (5 Questions)

The "Thinking" category evaluates cognitive abilities like problem-solving, decision-making, and how people handle difficulties. Researchers will be able to pair people with complimentary thought processes by better understanding how mentors and mentees make decisions and resolve issues.

Example Questions:

“What do you think about your life?”, “I believe in giving back (good or bad)”, “What is more important to you?”

Finding mentors and mentees with similar cognitive types is made easier with the help of this category. To enable a productive and successful mentoring process, a mentor's approach to problem-solving should be complementary to the mentee's.

3.3.3.7 Rating (5 Question)

Self-evaluation of a range of professional and personal abilities or qualities, including work ethics, leadership, and communication, is the main focus of the "Rating" category. These inquiries will assist in determining how people view their own skills and whether they match the requirements of a possible mentor or mentee.

Example Questions:

"How happy are you with everything in your life? (1 Lowest, 4 Highest)", "How excited are you to wake up every day?", "Rate Yourself "

Participants can evaluate themselves in this category and determine their areas of strength and growth. The answers make it possible for mentors to support mentees in areas where they need assistance by guaranteeing that the mentor-mentee match is founded on the self-evaluations of both sides.

3.3.3.8 Case Studies (15 Questions)

The more complex "Case Studies" category is meant to mimic actual situations. It poses hypothetical scenarios that mentors and mentees could run across and inquiries about their potential courses of action. This category will assist in comprehending how mentors and mentees approach different issues and think in real-world, practical situations.

Example Questions:

"Your best friend invited you for dinner and the food they prepared was really disgusting ... how do you react?", "What would you do if you got an E on your report card?", "Your least favorite food is for dinner, what would you do?"

In order to provide insight into how each participant might handle difficulties in a mentoring relationship, the case study questions are made to mimic real-world scenarios that mentors and mentees might encounter. This will make it easier to find mentors and mentees who approach problem-solving and mentoring others in a similar way.

3.3.4 Motive behind usage of Questionnaire method

The questionnaire's main objective is to collect detailed, organized data that represents the viewpoints of mentors and mentees. Using pre-formulated questions, the approach guarantees:

- **Standardization:** To facilitate comparison and analysis, each participant answers the same set of questions.
- **Scalability:** It enables researchers to effectively gather data from a sizable student and instructor population.

- **Objectivity:** By reducing biases, the structured format guarantees the validity and reliability of the data gathered.

The responses gathered in this way will be used as input for the matching process between mentors and mentees, which finds the best pairs using algorithms (such as string-matching algorithms or cosine similarity).

3.3.5 Target Population & Sampling Process

There are two primary groups within the target population:

3.3.5.1 Undergraduate Students (Mentees)

This category consists of undergraduate students from different sociocultural backgrounds, grades, and disciplines. They represent the cohort of mentees and are the ones receiving mentorship.

- **Justification for Inclusion:** Since students frequently deal with personal, professional, and academic difficulties, they are the main recipients of mentorship programs. A successful mentor-mentee matching system must take into account their varied needs and expectations.
- **Qualities**

Academic Discipline: Students from various disciplines, such as engineering, the arts, or the sciences, could have particular requirements.

Year of Study: While final-year students may concentrate on career-oriented mentorship, first-year students may need basic advice.

Socio-Cultural Background: Students' expectations and preferences in interactions with mentors may be influenced by socioeconomic and cultural factors.

3.3.5.2 Teachers (Mentors)

This group is made up of mentors who are teaching staff members from various departments. They mentor and assist students by providing them with emotional, professional, and academic guidance.

- **Justification for Inclusion:** Teachers have the skills and expertise necessary to effectively supervise students. Their function as mentors plays a crucial part in influencing students' growth.

- **Qualities**

Departmental Expertise: Diverse viewpoints are brought by mentors from various disciplines.

Teaching Experience: While more recent mentors may have a novel approach, more seasoned mentors may provide more systematic assistance.

Personal Mentoring Styles: The success of mentors can be influenced by their teaching methods, empathy, and communication abilities.

3.3.6 Steps in the Data Collection / Sampling Process

3.3.6.1 Questionnaire Design

Create a structured questionnaire that fits into the eight previously listed categories. This guarantees the depth and usefulness of the data.

3.3.6.2 Methods of Distribution

- **Online Distribution:** Google Form links were distributed to each class of students to fill the set of questions.
- **Moral Aspects Taken into Considerations:** Participation was kept entirely voluntary and that individuals are free to leave at any time .Assure respondents that their answers will remain anonymous and be used only for research.
- **Informed Consent:** Got participants' consent by clearly outlining the goal and methods of the study.

3.3.6.3 Pilot Study

The information gathered during the pilot study was examined and confirmed to be accurate and consistent. The respondents could easily understand what was required from them.

3.3.6.4 Data Cleaning

Eliminated incomplete or invalid responses to maintain dataset quality. This study guarantees the collection of high-quality, diverse data by using stratified randomization and strict data collection procedures. The methodical methodology ensures that the mentor-mentee matching framework accurately represents the target population's actual requirements and preferences.

3.3.6.5 Sampling Process

To guarantee representativeness and dependability, the research's sampling procedure was meticulously planned. The main tool for gathering data was a questionnaire that was created with particular research goals and important study factors in mind. Subject matter experts examined and verified the questionnaire to make sure it was clear, pertinent, and thorough. Atmiya University in Rajkot's undergraduate students made up the research's target demographic. To ensure a balanced representation, an algorithm for stratified random sampling was used to obtain a range of viewpoints from various academic areas and years of study. To increase accessibility and participation, the surveys were made available digitally.

Participants were briefed on the study's objectives and ethical considerations, including voluntary participation and confidentiality, prior to distribution. After the replies were gathered, they were methodically arranged and examined to extract insightful information that complemented the objectives of the study.

Table 3. 2: Mentor – Mentee Responses

Sr. No.	Category	Total Responses	Total Non-Respondent
1	Mentor	481	22
2	Mentee	4658	369
	Total	**5139**	**391**