International Journal of Research in Science and Technology

Volume 12, Issue 04: October-December 2025

ISSN 2394 - 9554

Exploring Professional Response Skills in Engineering Students: An Empirical Study

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ABSTRACT

Technical and job-related skills are a must in the present scenario. But sustaining in the job and progressing in the role at workplace can be acquired only with the help of soft skills. Soft skills are non-technical and personality-related skills that mould an employee into a professional. Among the various soft skills - like effective communication, teambuilding, flexibility, analytical thinking, optimism, change-readiness, critical thinking and leadership - the ability to respond professionally forms the basis of all these skills. It is believed that, the way one responds decides the success of the task and execution plays only a secondary role. Hence, it is necessary for college students to develop this Professional Responding Skill. The students are used to informal conversation with their peers and find it difficult to shift the tone to a formal one when responding to faculty and professionals. Thereby, the students face difficulty in shifting to formal interactions from informal conversations. This study deals with the responses of 200 engineering students. Their professional responding skills are assessed by 50 questions based on various professional scenarios. Additionally, their self-assessment on their professional responding skills is also analyzed. The study brings to light the difficulties faced by students in distinguishing different types of responses. The findings insist on the necessity of incorporating Soft Skill Training as part of the syllabus for the Engineering graduates.

Keywords: *Soft skills, Life Skills, Professional Responding Skill, Engineering students study, Self-Assessment study*

1 INTRODUCTION

In the current job market, employees are expected to have both Hard Skills, which are the technical skills, and Soft Skills, which are interpersonal skills needed for effective job performance. Updating the hard skills and strengthening the core subject increases the salary of the employee. In contrast, Soft Skills which are non-technical and people-oriented skills, help in maintaining interpersonal communication and ensuring a positive environment in the office. Soft Skills help in sustaining and progressing in the job. These enable us to collaborate with the team, evaluate team dynamics, guide team decisions, lead team efforts, and achieve a positive workplace.

1.1 Background

The synergy of technical expertise and interpersonal competencies is vital for career longevity and advancement, particularly for engineering students who must navigate both complex technical challenges and professional interactions. This study is on the critical role of soft skills in shaping the student's opportunities. The study focuses on professional responding skills, which enable students to communicate formally and effectively in workplace settings. Despite their proficiency and technical knowledge, many students struggle to adopt the formal tone required when engaging with faculty,

https://doi.org/10.64151/PSGCARE-14

ISSN 2394 - 9554

industry professionals. This gap hinders their career progression. This study analyses professional responding skills of 200 engineering students through 50 scenario-based questions and also analyses their self-assessments on their responding skills. Students are drawn to engineering for its robust career prospects, intellectual rigor, societal impact, prestigious reputation, diverse specializations, innovative opportunities, influential role models, and financial rewards. Integrating soft skill training into engineering education will empower students to bridge the divide between academic preparation and professional success, ensuring success in their chosen field.

1.2 Problem Statement

Engineering students encounter difficulty in articulating professional responses in academic and work environments.

1.3 Aim of the Research

The study aims to test and reveal the professional responding skills of engineering students in professional and academic scenarios while assessing their self-perception of these abilities.

1.4 Research Questions

1. What types of responses do engineering students formulate in professional and academic situations?
2. How effectively can engineering students structure professional responses?
3. To what extent do students' self-perceptions of their present communication skills align with their actual response quality?

2. LITERATURE REVIEW

The emerging demands and trends of the engineering profession have made it clear that technical skills alone are no longer sufficient for career success. ABET's accreditation criteria (2020) emphasize the need for engineering programs to develop the professional skills of students with special attention to communication and teamwork. This shift from strict technical knowledge to wider communication skill reflects the needs of the industry to employ engineers who both technically strong and communicatively competent. In contrast to the expectations, research by Trevelyan (2010) reveals a persistent disconnect between academics and workplace. As a result, graduates are struggling to adapt their communication styles to professional contexts. Similarly Dannels (2002) found that engineering students often enter the work environments without adequate training in workplace communication norms. This gap between the academic and workplace is further complicated by differing expectations between academic and professional environments (Clement and Murugavel 2018) According to them, the informal peer communication styles don't translate well to workplace interactions. The situation is exacerbated by what Kruger and Dunning (1999) describe as a common cognitive bias, where individuals with limited communication skills often tend to overestimate their competence, leaving them unaware of their deficiencies until they face the real professional scenario.

Recent studies suggest this communication skills gap has affected employability. Ajit and Deshmukh (2013) came out with the finding that employers consistently prefer communication abilities among the top factors in hiring decisions. Similarly, de Campos et al. (2020) demonstrate how soft skills like professional responsiveness directly impact career progression and workplace effectiveness. Rawboon et al (2019) suggests that Industry collaborations and sessions with industry experts help in bridging this

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ISSN 2394 - 9554

'environmental' gap by exposing students to authentic professional communication scenarios. However, Paretti's research (2008) presents a different perspective that these skills are best developed through intentional curriculum design which incorporates structured communication training throughout engineering programs rather than occasional learning. Lappalainen (2009) in his study suggests engineers to constantly shift between technical discussions with peers and more formal communications with managers or clients thereby maintaining the balance in communication.

Khakurel and Porras (2020) demonstrate how capstone projects with industry partners provide valuable opportunities for students to practice professional communication in authentic contexts. Similarly, Wilkinson et al. (2019) found that transdisciplinary workshops assist students develop consulting skills needed for professional practice. The cumulative evidence suggests that professional responding skills represent a critical but often overlooked component of engineering education. As the workplace continues to evolve, it is important to address these professional competencies. The current study focuses on examining professional responding abilities of the students

3. RESEARCH OBJECTIVES

This study pursues three key objectives:

1. To identify the type of majority response (e.g., direct, informal, manipulative, professional, or roundabout) formulated by engineering students.
2. To analyze the structure, clarity, and professionalism of students' responses in situational contexts.
3. To compare students' self-reported communication skills with the quality of their actual responses.

4. RESEARCH METHODOLOGY

4.1 Participants

The study targets 200 first-year engineering students from various departments. Participants must be enrolled in an engineering program and are recruited voluntarily via email and class announcements. This sample size ensures diversity while remaining practical for analysis.

4.2 Data Collection Tools

Tool 1: Questionnaire on Situational Responses

A questionnaire with 50 scenario-based multiple-choice questions was designed to assess students' ability to frame professional responses. Delivered via Google Forms, the questions reflect real-world academic and professional situations students may encounter. It is collected from 200 engineering students.

Categories of Questions:

- Time Management: Handling tight deadlines or overlapping tasks (e.g., responding to a professor's urgent request).
- Teamwork: Managing conflicts or task division (e.g., addressing a teammate's lack of

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contribution).

- Authority Interactions: Negotiating with professors or leaders (e.g., declining a task respectfully).
- Boundary-Setting: Balancing personal and work demands (e.g., refusing late-night requests).

Categories of Answers:

- Direct: Blunt or abrupt (e.g., "No way, I'm too busy!").
- Informal: Casual or unprofessional (e.g., "Chill, bro, we'll figure it out later!").
- Manipulative: Evasive or self-serving (e.g., "Maybe we can stretch the truth.").
- Professional: Clear and appropriate (e.g., "I'd like to help, but can we move it to this afternoon?").
- Roundabout: Vague or indirect (e.g., "Maybe later if I get time."). Correct answers align with the "professional" category, reflecting structured and context-appropriate communication.

Tool 2: Self-Assessment Feedback Form

A simple 20-item Likert-scale survey was developed to assess engineering students' views on their soft skills, focusing on five areas: Creativity and Communication, Confidence, Stress Resilience, Teamwork and Flexibility, and Self-Understanding. Statements include "I share new ideas confidently in discussions" for Creativity and Communication, "I stay calm in tough situations" for Confidence, "I handle group stress well" for Stress Resilience, "I adjust easily to team changes" for Teamwork and Flexibility, and "I know my communication strengths" for Self-Understanding. Students rated items from "Strongly Disagree" to the scale of "Strongly Agree." Data from 200 students were collected to explore their perceived skills.

4.3 Data Collection Process

A straightforward process was used to collect honest feedback from 200 first-year engineering students about their professional response skills. Basic steps ensured the data stayed reliable, preventing edited or inaccurate responses. User-friendly digital tools and careful supervision helped collect the situational response survey and self-assessment questionnaire smoothly. The process included:

1. Sending Google Forms links through email and class announcements for easy access.
2. Supervising submissions to ensure quick responses and avoid changes that could harm data quality.

5. RESULTS AND DISCUSSIONS

5.1 Overview of Response Types

Answers from 200 engineering students to 50 scenario-based questions reveal clear communication patterns of response types. The findings are:

- **Roundabout Responses**: 4,914 (49.14%), the most frequent, suggesting a strong inclination toward indirect communication.

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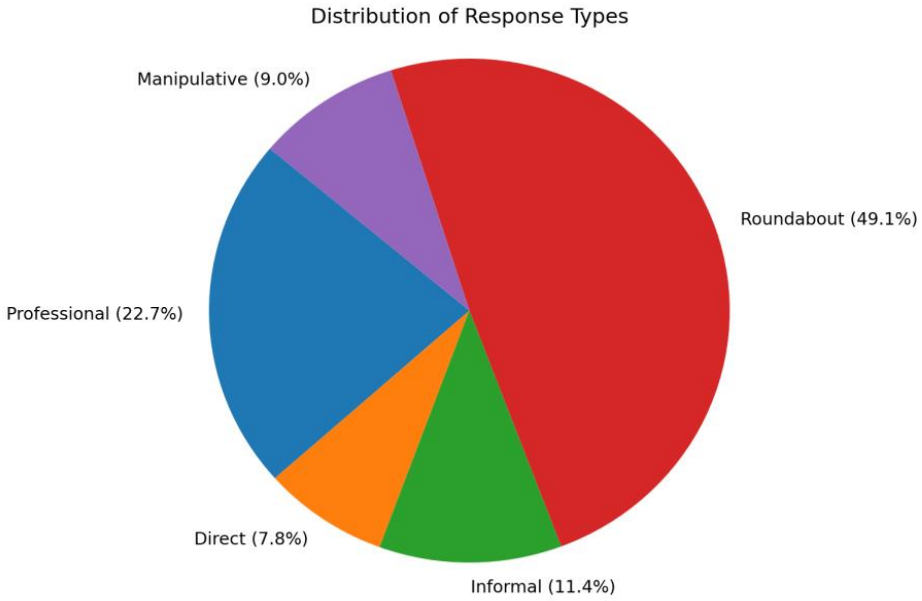
ISSN 2394 - 9554

- **Professional Responses**: 2,269 (22.69%), a noteworthy but secondary category.
- **Informal Responses**: 1,135 (11.35%), reflecting a tendency toward casual exchanges.
- **Manipulative Responses**: 901 (9.01%), indicating occasional use of influential tactics.
- **Direct Responses**: 781 (7.81%), the least common, highlighting a reluctance for straightforwardness.

This distribution in Figure.1 supports the literature's observation of students' challenges in adopting direct, professional communication, with the dominance of roundabout responses pointing to potential issues with clarity or confidence.

Figure.1: Distribution of Response Types



5.2 Self-Perception Analysis

The self-assessment data collected from engineering students across five key personal and professional domains offers valuable insights into their perceived competencies and confidence levels. Utilizing a 20-item Likert-scale, students rated their abilities in areas such as Communication and Innovation, Confidence, Emotional and Stress Regulation, Teamwork and Adaptability, and Self-Awareness.

Communication and Innovation:

The responses in Figure 2, "Strong, I contribute" (22.67%) and "Generally, I succeed" (20.40%) are the highest categories, indicating a positive self-image in contributing ideas. However, "Average, I attempt" (15.37%) and "Outstanding, I innovate" (9.82%) suggest moderate innovation confidence, while "Occasionally, I struggle" (3.27%), "Limited, I hesitate" (2.02%), and "Never, I falter" (0.50%) reflect minimal perceived difficulty. This distribution suggests optimism tempered by realism, with room for growth in innovation.

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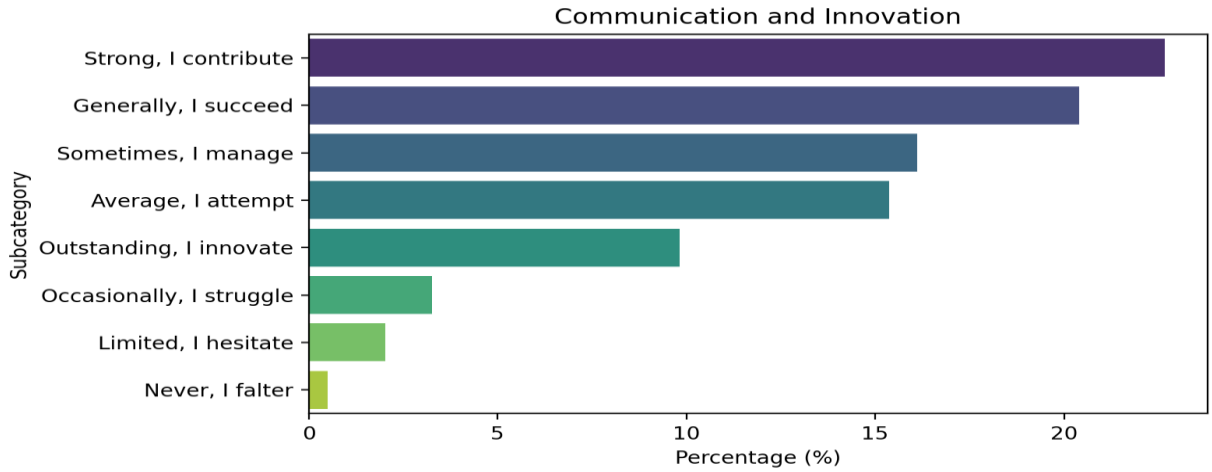
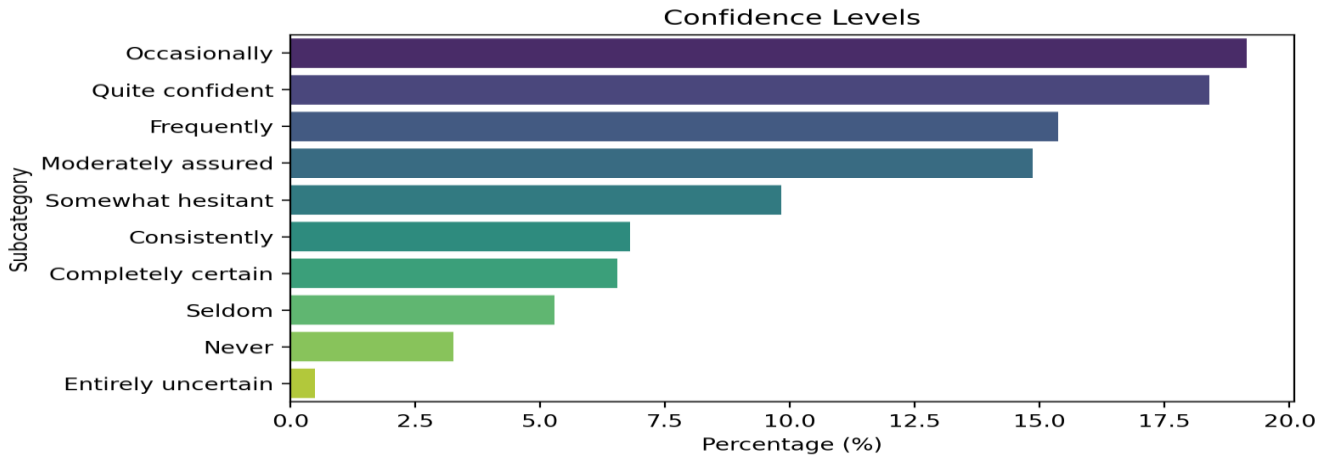
Figure 2: Self Perception analysis on Communication and Innovation



Confidence Levels:

The responses, "Occasionally" (19.14%) and "Quite confident" (18.39%) combine for 37.53%, the largest share, indicating a broad confidence range with slight hesitation. "Frequently" (15.37%) and "Moderately assured" (14.86%) add to this mid-tier confidence, while "Consistently" (6.80%), "Completely certain" (6.55%), "Seldom" (5.29%), "Never" (3.27%), and "Entirely uncertain" (0.50%) show a tapering toward lower certainty. This suggests a majority feel moderately capable but rarely fully assured and is depicted below.

Figure 3: Self Perception analysis on Confidence Levels



Emotional and Stress Management : The responses, "Sometimes, I pause" (20.51%) and "Reliably capable" (18.48%) total 39%, reflecting strong perceived stress resilience. "Adequately composed" (17.72%) and "Rarely, I hold steady" (16.20%) further support this, while "Never, I stand firm" (6.33%), "Often, I hesitate" (6.33%), "Exceptionally skilled" (6.08%), "Marginally effective" (5.32%), "Poorly equipped" (2.03%), and "Always, I freeze" (1.01%) indicate occasional vulnerabilities. This suggests robust coping mechanisms with minor lapses under pressure.

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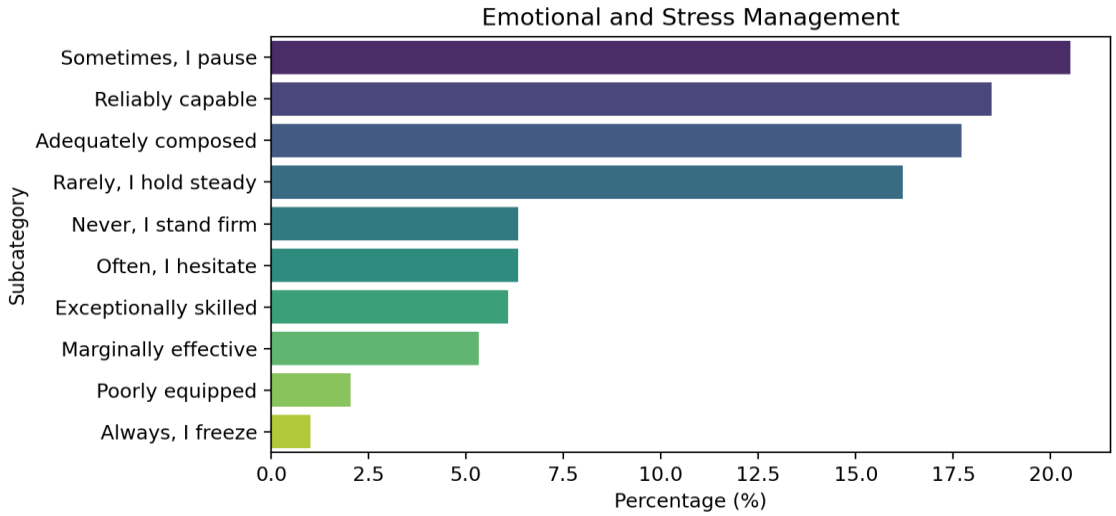
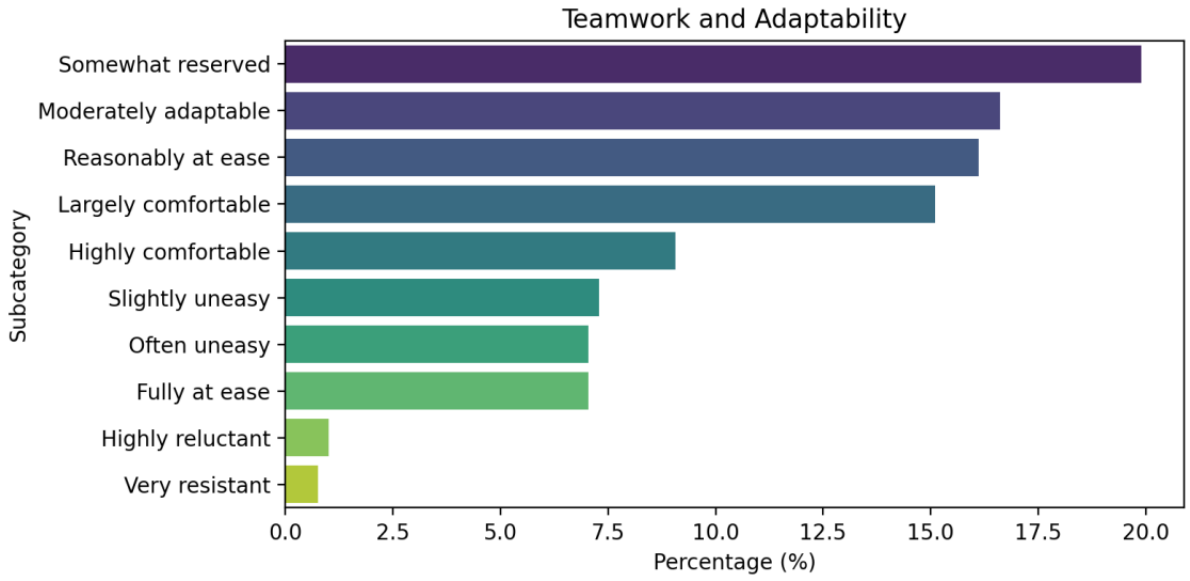
Figure 4: Self Perception analysis on Emotional and Stress Management



Teamwork and Adaptability: The responses, "Somewhat reserved" (19.90%) and "Moderately adaptable" (16.62%) lead the scale, and "Reasonably at ease" (16.12%) and "Largely comfortable" (15.11%) add to 67.75% mid-range adaptability. "Highly comfortable" (9.07%), "Slightly uneasy" (7.30%), "Often uneasy" (7.05%), "Fully at ease" (7.05%), "Highly reluctant" (1.01%), and "Very resistant" (0.76%) show a gradual decline, suggesting a balanced but reserved approach to collaboration.

Figure 5: Self Perception analysis on Teamwork and Adaptability



Self-Awareness: The responses, "Mostly, I'm steady" (20.60%) and "Mostly at ease" (17.84%) lead, with "Never, I unravel" (2.26%) low, reflecting robust self-awareness but potential overconfidence.

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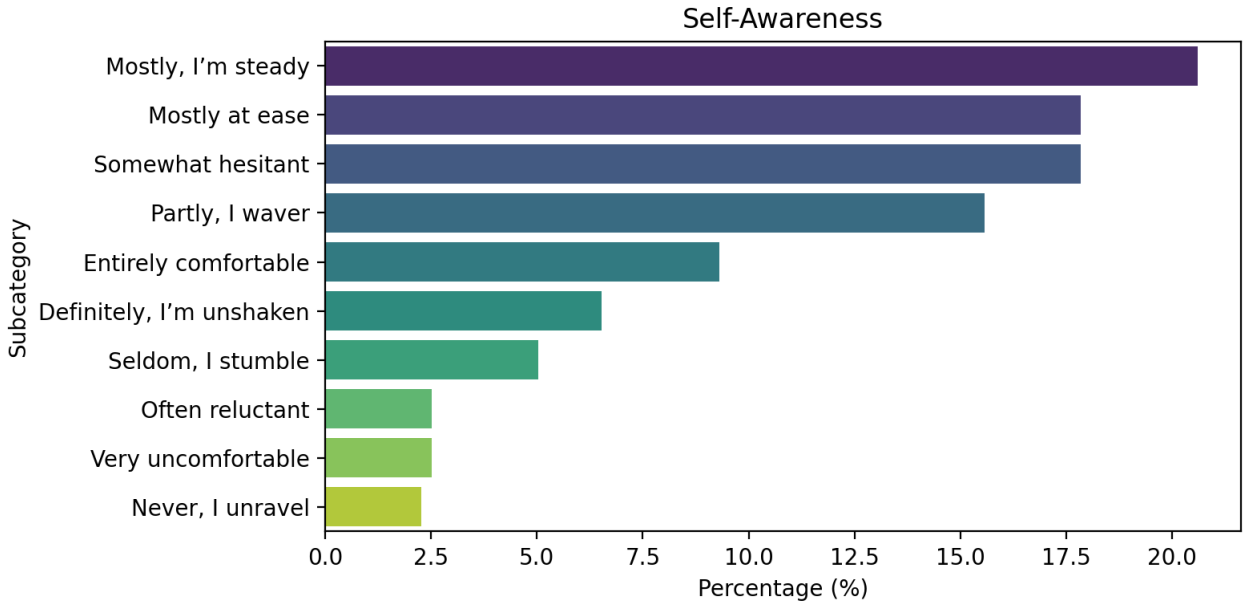
Figure 6: Self Perception analysis on Self-Awareness



5.3 Comparative Analysis

Peering into how students communicate and how they view their own abilities offers a window into their journey toward professional growth. Many students lean toward roundabout responses, which make up 49.14% of their answers, as if they're tiptoeing around clarity to stay polite or dodge uncertainty. Even those who feel quite self-aware often choose this indirect path, suggesting that knowing their strengths doesn't automatically lead to bold, clear communication. It's as if a lack of practice or training keeps them anchored in cautious habits.

When students brim with poise and certainty, they're more likely to opt for direct responses, which account for just 7.81% of their replies. This hints that a strong sense of self can spark straightforwardness, but such moments are rare. More often, students fall back on familiar, indirect ways, perhaps shaped by cultural expectations or a curriculum that doesn't stress clarity enough. The gap between their confidence and their actions feels like a missed opportunity waiting for guidance.

Students with middling confidence, on the other hand, seem caught in a balancing act. Their responses, split between informal (11.35%) and professional (22.69%), reflect a phase of figuring things out. They might slip into casual tones that work well with friends but falter in formal settings, like a student chatting easily in a dorm but stumbling in a boardroom. This back-and-forth reveals how their self-view shapes their words, nudging them toward informality when professionalism is needed.

How students handle stress also colors their communication. Those who feel equipped to manage pressure—39% claim they do well here—are less likely to use manipulative responses, which appear in 9.01% of cases. Yet, some still turn to these tactics, perhaps as a reflex when feeling cornered or unsure. It's almost as if stress pushes them to sidestep honesty, pointing to a need for training that builds healthier ways to cope and communicate.

https://doi.org/10.64151/PSGCARE-14

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Even students who rate their self-awareness highly, with 38.44% feeling steady, don't always translate that into direct or confident responses. The heavy tilt toward roundabout answers (49.14%) suggests that recognizing their abilities isn't enough to shift their habits. They might see their strengths clearly but lack the tools or practice to speak with authority, a reminder that awareness alone doesn't bridge the gap to professional communication (Kruger & Dunning, 1999).

Then there is the case of informal responses, often tied to students with moderate confidence and ease. These 11.35% of replies show a comfort with casual conversation that doesn't always fit professional expectations. It's like they're speaking in a language that feels safe but falls short in a job interview. This pattern calls for training that helps students adapt, teaching them to switch from casual to polished depending on the moment (Khakurel & Porras, 2020).

5.4 Implications

The dominance of roundabout responses (49.14%) reveals how students struggle to speak clearly and confidently, which can lead to confusion and slow down teamwork. Their frequent use of informal replies (11.35%) shows a habit of casual language that might charm peers but weaken their professional presence. Manipulative responses, at 9.01%, raise red flags about honesty, suggesting a need for lessons in straightforward, ethical communication. The mismatch between students' self-view—39% feels strong in stress management—and their actual output, with only 22.69% professional responses, points to a tendency to overestimate their skills (Kruger & Dunning, 1999). This underscores the value of focused training to help students match their confidence with real-world performance, preparing them for workplace demands.

5.5 Analysis of Differentiation Challenges and Pedagogical Approaches

This section examines the difficulties engineering students face in distinguishing informal from professional communication styles and proposes practical teaching methods to improve their skills.

5.5.1 Challenges in Differentiating Response Types

Students encounter specific barriers when trying to adopt professional communication styles. These challenges, outlined below, hinder their ability to adapt responses to different contexts.

- **Language Habits**: Students often use casual language, like "Let's do it later," in peer or digital interactions; making it hard to switch to formal phrases, such as "Could we reschedule this task?" They consider it lengthy and impractical.
- **Absence of model**: The students have limited exposure to professional communication during college. Hence they have no idea on the effective responses to be delivered in specific instances.
- **Contextual multiplicity:** Diverse settings, like group projects with varied participants, make it difficult to identify the right communication style due to unclear situational cues.
- **Habitual Norms**: Peer groups reinforce informal phrases, such as "No big deal," even in semi-formal situations, blurring the line between casual and professional communication.

5.5.2 Pedagogical Strategies for Enhancing Differentiation

Targeted teaching strategies can help students develop appropriate communication skills. The following methods provide a clear framework for improvement.

- Students should consider the audience to choose the right tone, using casual phrases like "No

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ISSN 2394 - 9554

problem" with peers but formal ones like "I suggest addressing this soon" with supervisors.

- Students should evaluate the purpose of their communication, using structured responses for professional tasks, like interviews, while allowing casual tones for informal exchanges.
- Reading responses aloud help students to spot casual tones and adjust them to sound more professional. The tone and pitch of the responses can be adjusted by continuous practice.
- Audio Visual Content related to workplace communication can help in imbibing the structures of professional conversation.
- Role-playing activities, such as practicing introductions from "Here's my friend" to "Let me introduce my colleague," supported by AI tools, help students practice and improve.

5.6 Recommendations for Enhancing Engineering Students' Communication Competencies

Engineering students should aim beyond technical knowledge to thrive in today's workplace. They need the ability to communicate with clarity and professionalism. A carefully designed 12-hour communication course spread over two semesters could make a real difference. Role-playing exercises on delivering project updates to managers, working with the team, negotiating deadlines with clients, setting boundaries with colleagues would help transform hesitant speakers into confident professionals.

Regular workshops led by industry veterans on actual workplace dilemmas like handling a conflict between team members or responding to critical feedback would bring in the practical knowledge of workplace. These discussions with industry people ould emphasize direct, ethical communication, helping students move away from vague or defensive responses. Morever, monthly peer evaluations with faculty input would provide targeted feedback on shifting from casual campus speech to polished professional dialogue.

In order to improve the Cultural awareness and inclusivity, students can be subjected to intensive sessions on navigating global workplaces, being assertive in their expression, and also respecting different communication styles. Students can track their growth through Weekly reflection journals with faculty reviews, helping them to bridge the gap between their perception and actual performance. For tech-savvy learning process, AI coaching tools which offer instant feedback on practicing emails and speech presentations can be helpful. These AI Technology help students refine their tone in a low-pressure setting. Putting these recommendations into practical application help the students to build the interpersonal intelligence needed for their professional life.

6. CONCLUSION

A close look at engineering students' communication patterns reveals a troubling trend. Only about one in five responses (22.69%) demonstrates true professional quality, while nearly half (49.14%) tend toward vague, roundabout language. Add in informal (11.35%) and occasionally manipulative replies (9.01%), and we see a clear pattern - many students default to communication styles that fall short of workplace expectations.

What's particularly revealing is the disconnection between how students view themselves and how they actually perform. While 39% rate themselves as strong stress managers and 38.44% claim solid self-awareness, their actual responses tell a different story. This gap suggests many don't realize when they're being unclear or indirect - they think they're communicating effectively when they're actually struggling to express themselves with professional clarity.

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ISSN 2394 - 9554

The solution lies in targeted, practical training. Students need opportunities to practice professional communication in realistic scenarios - the kind they'll actually face in their careers. This isn't just about polishing their technical reports; it's about helping them develop the self-awareness to recognize when they're being unclear, and the skills to communicate with directness and integrity. By closing this gap, we can prepare students not just to be competent engineers, but effective professionals who can navigate workplace relationships with confidence.

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