Communication Barriers in Technical Faculties

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Abstract

Effective communication is a fundamental skill in all sectors and is very important for academic and professional success. In higher education, especially in technical fields, it faces unique challenges. This paper investigates and analyzes the main communication barriers experienced by students from a technical faculty, both in their interactions with teachers and with their colleagues. A custom-designed questionnaire was applied to 125 students from different domains from a technical faculty. Beyond general comfort and frequency of communication, the instrument included questions to identify their problems from multiple categories: linguistic barriers, environmental barriers, perceptual/positional barriers (fear of judgment, status differences), and conceptual barriers (preconceptions, misinterpretation of messages). These options were based on classic models of communication breakdown and adapted to the academic context. The analysis revealed that many students do not feel fully comfortable engaging in dialogue with their teachers and there are many barriers in this process. In contrast, in the case of their colleagues, communication is much easier and more relaxed, with fewer obstacles. This paper highlights the importance of addressing communication barriers not only as interpersonal issues but as structural challenges in the educational process. These not only affect the quality of academic performance and collaboration but also influence students' confidence and motivation to participate actively in learning experience.

Keywords: communication barriers; higher education; student-teacher interaction; student-student interaction technical faculty

1. Introduction

Communication is fundamental in all areas of personal and professional human activities. Practically it is a real help in making a better life, because we can build relationships, we can express our needs or emotions, we can solve conflicts, we can transmit our ideas efficiently to our family or to our coworkers. Therefore, communication is not just about transmitting information, it is a powerful method for change, collaboration, understanding and evolution. Many people or students are educated in the specialization they choose (economics, healthcare, management or engineering etc.), but in most cases they do not receive explicit training in communication (Barevičiūtė et al., 2023; Genç, 2017; Radovic Markovic & Salamzadeh, 2018; Sanchis-Giménez et al., 2023). In today's world, these skills are no longer optional, they are mandatory for modern society (Barevičiūtė et al., 2023).

In education, effective communication is very important if we want a successful educational process, functioning as an essential bond between teachers and students. In addition to the transfer of knowledge, it is essential for students to be educated in an environment where mutual understanding, questions and debate are encouraged. Teachers can adapt teaching methods to the diverse needs of students, provide constructive feedback and stimulate curiosity. On the other hand, students who feel comfortable expressing their ideas, concerns or even admitting their mistakes will have a deeper and more relevant learning experience. Quality communication transforms the classroom from a simple training space into a laboratory of ideas and an active learning community, preparing individuals capable not only of knowing, but also of relating and collaborating (Ragusa et al., 2022).

In technical education, the importance of communication takes on a practical and immediate dimension, as career success depends as much on interpersonal skills as on technical knowledge. An engineer, technician, or IT professional must be able to accurately communicate project specifications, explain complex solutions to non-technical clients, and work in a team to solve

the problems (Genç, 2017; Kakepoto et al., 2022). Despite its importance, communication is often undervalued or taken for granted in technical faculties, where the primary focus remains on developing specialized skills and domain-specific knowledge. As a result, many students in engineering and technology programs graduate with limited experience in navigating the complexities of academic and professional communication.

In every process and type of communication, there are some elements who can block or affect the information transmitted between the emitter and the receiver. These are called barriers and there are in fact, any factor, be it physical (noise, faulty technology etc.), psychological (prejudice, strong emotions…) or semantic (jargon, language differences…), that prevents accurate understanding (Kakepoto et al., 2022). Their appearance transforms communication from a straightforward process into an unproductive one (Khairdi et al., 2024), regardless of whether we are talking about the educational process or a work situation. Understanding and identifying these barriers is the first essential step towards improving the quality of our interactions (Bratchuk & Smith, 2023).

This paper investigates the communication barriers perceived by students in a technical faculty, based on a structured questionnaire distributed to undergraduate and master's students. The object is to analyze the students' experience communication with both teachers and colleagues, highlighting areas that require pedagogical or institutional attention. The instrument was applied to 125 students from various engineering specializations, and it is structured in three sections: demographic data (gender, year of study and specialization), barriers in student-teacher communication and barriers in student-student relations. The results showed that students feel significantly more comfortable communicating with their colleagues than with their professors. Fear of being judged is one of the strongest experienced barriers. There are no gender-based differences in the type of communication barriers reported. Students who perceive their professors as less available are more likely to report communication barriers.

2. Communication Barriers

Communication in technical higher education should not be limited to transmitting information; this process is a complex one and it should be about knowledge construction, feedback, and relationship-building among teachers and students. Different models of communication were proposed to improve technical communication, adapted and applied then in other sectors. Among them, one of the most influential is Berlo's SMCR Model, which conceptualizes communication as a process involving: source, message, channel, and receiver (Rubino et al., 2022). Its structure is represented in **Figure 1**. The "source" can represent the teacher, while the "channel" can include face-to-face lectures and virtual classrooms.

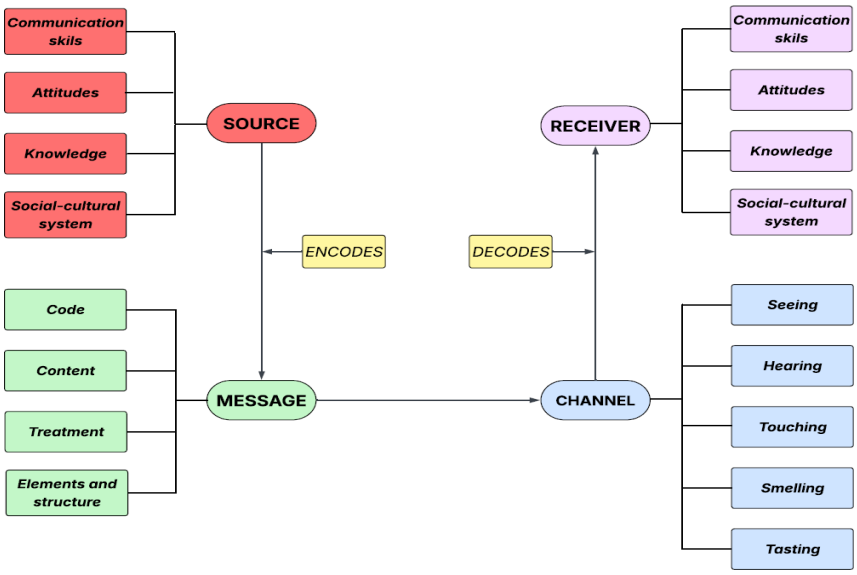


Figure 1. Berlo's SMCR model (Kashikar, 2024)

In the academic context, this model helps educators analyze how information flows within the classroom, emphasizing that communication effectiveness depends on the teacher's clarity, knowledge, and attitude, as well as the student's ability to interpret and respond. Therefore, Berlo's framework provides a systematic foundation for understanding how teaching and learning function as communicative acts. The model focus on the interdependence of

communication skills, attitudes, and cultural awareness is especially relevant in today's diverse and globalized classrooms. Effective educators in today's teaching must not only design clear messages but also consider students varied technological access, digital literacy, and socio-cultural backgrounds to ensure equitable learning experiences. There are several factors that can affect the entire process of communication: the personal context of both the sender and the receiver, disposition toward the topic, existing knowledge, or cultural lens (Rubino et al., 2022).

The aforementioned aspects can be called barriers in communication. These can obstruct or distort the transmission of information between the sender and the receiver. There are numerous types of communication barriers, each affecting the clarity and effectiveness of interpersonal exchanges. Semantic or linguistic barriers refer to issues such as unclear phrasing, words with multiple interpretations, inadequate translations, unspoken assumptions, or the excessive use of technical jargon. Interpersonal barriers appear when the intended message is not received or interpreted as intended by the sender. Fear of criticism/judge, including ridicule, mockery, or laughter can discourage students from participating actively and expressing their opinions. Psychological barriers, such as ego, prejudice, closed-mindedness, status dynamics, or daydreaming, can disrupt attention and understanding. Physical barriers include environmental and behavioral issues like poor listening skills, ineffective non-verbal cues, mental fatigue, background noise, and limitations imposed by time or distance. Emotional barriers, such as anger, pride, anxiety, distrust, or depression, can heavily influence how a message is delivered or perceived. Perceptual barriers refer to individual differences in values, attitudes, tone, or voice modulation. Additionally, cultural barriers may affect communication through differing norms, behaviors, or expectations regarding etiquette and interaction. Stress, low self-confidence, and past negative experiences can severely hinder communication, particularly among students in technical education environments. Cognitive barriers, meanwhile, surface when the linguistic or conceptual demands of information exceed the reader's capacity to process or integrate it effectively (Kakepoto et al., 2022; Maaß & Rink, 2024). All of these can occur and have a meaningful impact on students' access to learning and active participation in educational act.

3. Methodology

This paper used a quantitative descriptive research design aimed at identifying communication barriers experienced by students in technical faculties. The study explored both student-teacher and student-student relations, highlighting how various types of obstacles may interfere with educational interactions. Usually, in technical faculties, where curricula are often dense and interactions are heavily content-focused, effective communication plays a critical role not only in academic performance but also in social integration, collaborative learning, and psychological well-being. By identifying and classifying the barriers that students perceive in these interactions, the study could help to improve communication practices. The approach is diagnostic in nature, designed to capture both the frequency of reported obstacles, grouped into classic categories such as linguistic, environmental, perceptual, and conceptual barriers.

The research instrument used in this study was a structured questionnaire designed for students enrolled in technical higher education. Its purpose was to identify perceived communication barriers and differences in how students interact with professors and colleagues. It was structured into four main sections, totaling over 20 items, combining both closed-ended and open-ended questions:

- Section 1 – Demographics: gender, year of study, and field of specialization.
- Section 2 – Teacher-student communication: included Likert-scale questions measuring comfort in communication and perceived teacher availability, followed by multiple-response items to identify barriers: fear of judgment, lack of time, language issues (technical vs. accessible), conceptual misunderstandings, environmental noise, lack of openness of teachers, barriers of perception or position (status differences).
- Section 3 – Colleagues barriers: analogue with Section 2, focusing on students' interactions with their colleagues, including a similar list of potential obstacles adapted for peer relationships: lack of trust, fear of judgment, lack of listening skills, lack of clarity in expression, differences in opinions or values, language barriers (e.g., technical terms, vague expression), environmental barriers (e.g., large groups, time pressure,

inadequate platforms), perceptual/positional barriers (e.g., dominant informal leaders, different academic status), conceptual barriers (e.g., assumptions, misinterpretations).

- Section 4 – Open suggestions: students were invited to provide suggestions for improving communication with both professors and colleagues.

The Likert-type items were coded on an ordinal scale (1 = Never, 5 = Always / Very much), while the multiple-response questions were transformed into binary variables (0 = not selected, 1 = selected) for each barrier. The Likert-scale questions were: "Do you feel comfortable communicating with your teachers?", "Do you think teachers are available for questions or clarifications?" and "In general, do you feel comfortable communicating with your colleagues?". The instrument was administered online. Participation was completely voluntary. All responses were anonymous, and no personal data was collected that would allow the identification of respondents. A total of 125 valid responses were collected and prepared for statistical analysis using SPSS.

The participant were undergraduate students enrolled in different programs within a technical faculty: electronics, telecommunications and information technologies – named IETTI, electrical engineering – called IE, electrical engineering and computers (IEC), and systems engineering (AIA). Participants were distributed across three years: I, II and III. Basic demographic information such as gender, year of study, and field of specialization was collected. Their distributions are represented in **Figure 2**.

The hypotheses formulated for this study are:

H1. Students feel significantly more comfortable communicating with their colleagues than with their professors.

H2. First-year students report more communication barriers with professors compared to students in higher years.

H3. There are gender-based differences in the type of communication barriers reported.

H4. Students who perceive their professors as less available are more likely to report communication barriers.

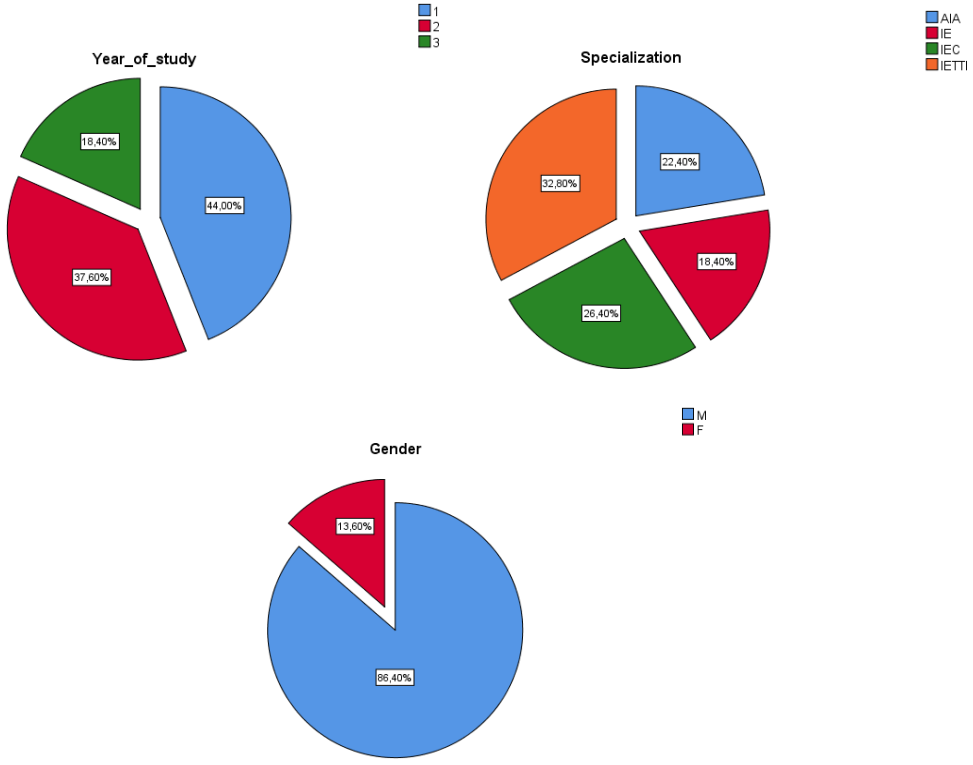


Figure 2. Participants distribution

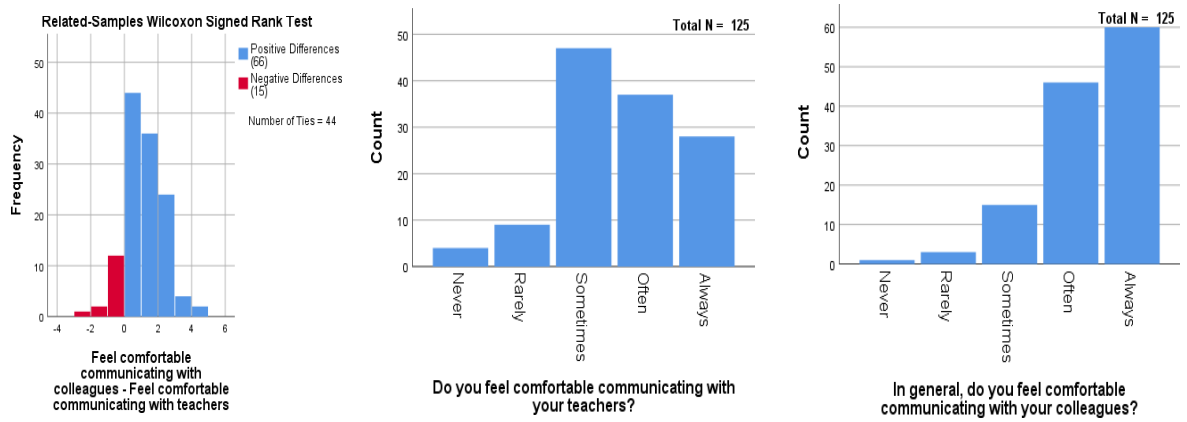
4. Results

This section presents the statistical analysis of the data collected through the applied questionnaire, used for testing the hypotheses formulated in previous paragraph. This was realized with IBM SPSS Statistics.

H1. To test hypothesis H1, a Wilcoxon Signed-Rank Test was conducted to compare students' self-reported communication comfort with their professors versus their colleagues. Both variables

were measured on a 5-point Likert scale ranging from 1 (Never) to 5 (Always). The results are presented in **Figures 3a**, **3b** and **3c** and reveal a statistically significant difference between the two conditions, $Z = 5.662$, $p < 0.001$. The test statistics were 2827.00 (SE = 206.01), based on a total sample of 125 students. These confirm H1 and indicate that students feel significantly more comfortable communicating with other students than with their professors.

H2. To evaluate hypothesis H2, a Kruskal-Wallis H test was applied to determine whether the number of communication barriers reported in interactions with professors differs depending on the year of study.



a) b) c)

Figure 3. Wilcoxon Signed-Rank Test

H2. The sample included 125 students: 55 in the first year, 47 in the second year, and 23 in the third year. The test revealed no statistically significant differences in the total number of reported barriers among the three groups, $\chi^2(2) = 5.111$, $p = 0.078$. Although first-year students had slightly higher average ranks, the result did not meet the conventional threshold for statistical significance. Therefore, H2 is not confirmed. While some descriptive trends suggest that early-year students may face more communication difficulties, these differences are not strong enough.

H3. To examine H3, a Mann–Whitney U test was conducted to determine whether there are significant gender differences in the number of communication barriers reported in interactions with professors. The analysis included 125 participants, with males and females as the two comparison groups. The test revealed no statistically significant difference between the two groups, U = 1102.000, Z = 1.406, p = 0.160. While the median number of reported barriers was slightly higher among female students, the difference is not significant. So, H3 is not confirmed.

H4. To test Hypothesis H4, a Spearman rank-order correlation was conducted between students' perception of their professors' availability and the total number of communication barriers they reported. The results revealed a weak but statistically significant negative correlation ($\rho = -0.178$, $p = 0.047$, $N = 125$). In this case, the hypothesis is confirmed, indicating that students who perceive their professors as less available tend to report more communication barriers. Although the effect size is small, the statistical significance suggests a meaningful association. It highlights the potential impact that perceived availability and approachability of professors can have on students' willingness to engage in open communication.

In order to explore the frequency and nature of communication obstacles, students were asked to indicate the presence or absence of specific types of barriers in their interactions with both professors and other students. The analysis results are presented in **Table 1**.

Barrier type	**With teachers**		**With colleagues**	
	Frequency	**Percent (%)**	**Frequency**	**Percent (%)**
Fear of judgment	49	39,2	18	14,4
Lack of time	47	37,6	-	-
Language issues (technical vs. accessible)	19	15,2	18	14,4
Conceptual barriers	28	22,4	27	21,6
Environmental barrier	8	6,4	12	9,6

Lack of openness of teachers	30	24	-	-
Barriers of perception or position	27	21,6	14	11,2
Lack of trust	-	-	23	18,4
Lack of listening skills	-	-	10	8

Table 1. Barrier's frequency in technical faculties

For visual and intuitive representation, **Figure 4** illustrates the comparative distribution of communication barriers reported by students in a technical faculty when interacting with professors versus their colleagues. The results clearly indicate that students perceive significantly stronger barriers in communication with professors. The most frequently reported obstacle in the teacher–student relationship is fear of judgment (49 responses), followed closely by lack of time (47) and lack of openness (30). These suggest a dominant perception of asymmetry and limited access, which may inhibit open dialogue in formal academic settings. Additionally, barriers of perception/position and conceptual misunderstandings were reported at similar frequencies (around 22–27 responses), reflecting issues related to status differences or abstract, misunderstood content.

In contrast, communication with colleagues appears more fluid. While some barriers persist, such as lack of trust (23 responses) and conceptual misunderstandings (27), the overall frequencies are consistently lower. Moreover, aspects like lack of listening skills or language issues appear marginal, indicating a more informal and psychologically safer communication context among colleagues. This contrast highlights the need to militate for a more inclusive and empathetic communication culture between professors and students, while also recognizing the relative ease with which students relate to their colleagues. Institutional strategies could address both structural (e.g., time availability) and emotional (e.g., fear of being judged) barriers to improve the overall learning experience.

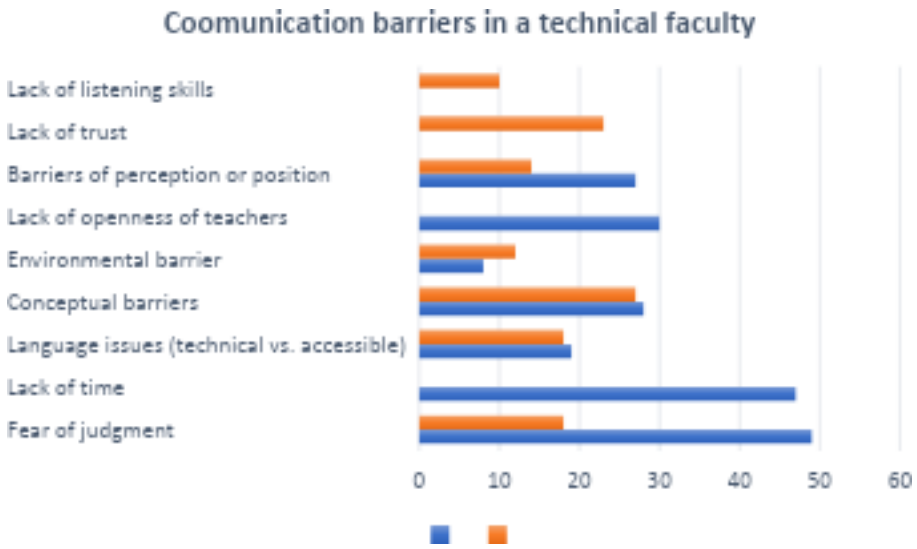


Figure 4. Communication barriers in a technical faculty

In addition to the structured items, the questionnaire included open questions that invited students to share their personal suggestions for improving communication, particularly with professors and colleagues. A thematic review of the responses revealed several recurring ideas, such as the need for professors to be more approachable and empathetic, the importance of an environment where students feel safe to express opinions without fear of judgment, and the call for clearer, less technical language in teaching. Students also suggested more interactive teaching styles, regular feedback sessions, and increased informal contact opportunities.

5. Conclusions

This paper investigates the communication barriers experienced by students in a technical faculty, both in their interactions with professors and those with colleagues. Quantitative data reveal that students have more obstacles when communicating with academic staff, particularly due to fear of judgment, lack of time, and limited openness from teachers. In contrast, communication with colleagues appears to be more relaxed, with some problems with trust and conceptual barriers. Two of the four formulated hypotheses were confirmed, with significant

differences: students communicate easier with their colleagues than with their professors and a lower perceived availability of professors is associated with a higher frequency of reported communication barriers among students. The other two were not supported by data, so gender and year of study have no influence on the type and frequency of communication barriers perceived by students.

The results suggest that professors have to encourage dialogue without fear of judgment, that greater availability, trust, and openness on the part of professors are essential for improving communication with students. Additionally, the open-ended responses highlight the value of empathy, non-judgmental attitudes, and interactive teaching approaches.

Some solutions to improve communication in technical faculties can include: training for teachers on empathetic communication, active listening and constructive feedback; promote activities such as brainstorming, free discussions in small groups; formative assessments (without grades) that encourage communication without pressure; constructive and personalized feedback provided to students regarding their progress; mixed work groups that encourage collaboration and horizontal communication, informal extracurricular activities.

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