

Role of Nonverbal Communication Training in Enhancement of Employability Potential in Engineering Students

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Abstract

In the evolving landscape of global employment, the employability of graduates is increasingly shaped not only by technical expertise but also by their ability to project confidence, credibility, and professionalism through non-verbal cues. Research consistently demonstrates that non-verbal communication skills significantly influence perceptions of competence and employability during recruitment interactions (Mehrabian, 1972; Burgoon, Guerrero & Floyd, 2016). Engineering students, despite strong academic preparation, often experience employability gaps due to insufficient development of behavioral communication skills that shape first impressions and professional presence (Gokuladas, 2010; Islam & Kirillova, 2020). This paper examines the role of structured nonverbal communication training as a driver of employability enhancement within higher education. Core non-verbal elements—posture, eye contact, gestures, facial expressions, and professional appearance—have been shown to influence hiring decisions and interview performance (Bonaccio et al., 2016; Cannata et al., 2024). Particular emphasis is placed on the development of confidence, gravitas, and social intelligence as mediators that strengthen employability potential among engineering students (Carney, Cuddy & Yap, 2010; Lopes et al., 2015). The paper also highlights curricular gaps in engineering programs, which often privilege technical knowledge over essential employability skills (Yusoff, 2010). By proposing an integrated nonverbal communication training framework, the study underscores the need for higher education institutions to embed behavioral communication training to ensure graduates enter the workforce with both competence and confidence.

Keywords: Non-verbal communication, Employability Skills Body language, Confidence, Higher Education, Engineering Students, Social Intelligence

Introduction

In the contemporary global employment landscape, graduate employability has emerged as a critical concern for higher education institutions, employers, and policymakers alike. Rapid technological advancements, increased automation, and the evolving nature of work have intensified competition in the job market, making employability dependent not only on technical competence but also on behavioral and interpersonal capabilities. While engineering graduates are equipped with domain-specific knowledge, employers increasingly emphasize communication competence, professional presence, and interpersonal effectiveness

as decisive factors during recruitment and workplace integration (Gokuladas, 2010; Bonaccio et al., 2016).

Among the various dimensions of communication, non-verbal communication plays a particularly influential role in shaping perceptions of confidence, credibility, and professionalism. Non-verbal cues such as posture, eye contact, facial expressions, gestures, and appearance significantly affect how individuals are evaluated in high-stakes professional interactions, including job interviews and workplace communication (Burgoon, Guerrero, & Floyd, 2016). Research suggests that a substantial proportion of meaning in interpersonal communication is conveyed through non-verbal channels, often exerting a stronger impact than verbal content alone (Mehrabian, 1972). Consequently, non-verbal communication has become a critical determinant of first impressions, which are formed rapidly and tend to persist throughout subsequent evaluations (Pease & Pease, 2004).

The importance of non-verbal communication is particularly pronounced in the context of graduate recruitment. Hiring decisions are frequently influenced by candidates’ ability to project confidence, composure, and social intelligence, all of which are largely communicated non-verbally (Koprowska, 2020). Studies have shown that recruiters often infer employability-related attributes—such as leadership potential, adaptability, and emotional intelligence—based on observable non-verbal behavior during interviews (Cannata, O’Hora, & Redfern, 2024). Despite possessing strong academic credentials, many engineering students face employability challenges due to inadequate development of these behavioral communication skills, leading to a disconnect between educational outcomes and labor market expectations (Islam & Kirillova, 2020).

From an educational perspective, this gap highlights a critical limitation within traditional engineering and management curricula, which predominantly prioritize technical knowledge and cognitive skills while offering limited structured training in non-verbal communication and professional behavior (Yadav et al., 2025). Although soft skills have gained increasing attention, existing training interventions often focus on verbal communication and presentation skills, leaving non-verbal dimensions underemphasized and insufficiently assessed (Yusoff, 2010). Moreover, while prior research acknowledges the relevance of non-verbal communication in professional effectiveness, empirical investigations examining the impact of structured non-verbal communication skills training on employability outcomes remain limited, particularly within the context of engineering education in emerging economies.

The academic significance of examining non-verbal communication training lies in its potential to extend employability theory beyond technical and verbal competencies by integrating behavioral communication as a measurable and trainable construct. Practically, such research offers valuable insights for higher education institutions, career development programs, and employers seeking evidence-based strategies to enhance graduate readiness and professional effectiveness. By systematically evaluating how non-verbal communication skills training influences key employability parameters, this study contributes to bridging the gap between academic preparation and workplace expectations.

This paper aims to examine the impact of structured non-verbal communication skills training on the employability potential of engineering students, with particular emphasis on its influence on confidence, professional presence, and perceived employability in recruitment contexts.

Literature Review

Graduate employability has been widely examined across disciplines, with scholars increasingly recognizing that employability extends beyond technical knowledge to include behavioral, interpersonal, and communication competencies. Employability is commonly defined as a combination of skills, attributes, and personal qualities that enable individuals to obtain and sustain employment and perform effectively in professional roles (Holik & Sanda, 2020). In engineering education, however, employability research has traditionally emphasized technical proficiency and problem-solving ability, often marginalizing communication-related competencies (Gokuladas, 2010; Wu, Xu, & Philbin, 2023).

2.1 Employability and Communication Skills

Communication skills have consistently been identified as a core employability requirement across industries. Studies report that employers prioritize candidates’ ability to articulate ideas clearly, collaborate effectively, and demonstrate professional confidence during recruitment and workplace interactions (Rao & Patil, 2024). While verbal communication has received substantial scholarly attention, recent research indicates that communication effectiveness is inherently multimodal, involving verbal, paralinguistic, and non-verbal components (Bonaccio et al., 2016).

In the context of engineering education, several studies highlight a persistent mismatch between graduates’ self-perceived communication competence and employer expectations. Yadav and Tiwari (2024) found that engineering students frequently overestimate their communication readiness while underperforming in real interview and workplace scenarios. This discrepancy suggests that communication skills development within higher education may be insufficiently aligned with professional evaluation criteria.

2.2 Non-Verbal Communication in Professional Contexts

Non-verbal communication (NVC) encompasses facial expressions, eye contact, posture, gestures, proxemics, and appearance, all of which play a significant role in interpersonal perception and judgment. Burgoon, Guerrero, and Floyd (2016) argue that non-verbal cues function as primary indicators of dominance, credibility, emotional intelligence, and social competence in professional interactions. These cues are especially salient in situations involving first impressions, such as job interviews and assessment centers.

Empirical studies demonstrate that recruiters often form rapid judgments about candidates’ suitability based on non-verbal behavior. Cannata, O’Hora, and Redfern (2024) showed that non-verbal expressions significantly influenced assessors’ perceptions of candidate fit, attractiveness, and professionalism, even when verbal content was controlled. Similarly, Bonaccio et al. (2016) emphasized that non-verbal behavior in the workplace affects performance evaluations, leadership perceptions, and career advancement.

2.3 Non-Verbal Communication and Employability Outcomes

A growing body of literature links non-verbal communication directly to employability outcomes. Research indicates that candidates displaying confident posture, appropriate eye contact, and controlled gestures are more likely to be perceived as competent and employable (Koprowska, 2020). Pereira, Meng, and Hone (2021) further demonstrated that a combination of body language, facial expressions, and hand movements significantly predicted communication effectiveness during professional media interactions.

Within engineering education, Lopes et al. (2015) identified social and non-verbal skills as key predictors of graduates’ ability to integrate into professional environments. Wu et al. (2023), using an Outcome-Based Education (OBE) framework, found that both verbal and non-verbal communication skills significantly influenced employability indicators among engineering students, reinforcing the argument that technical expertise alone is insufficient in contemporary labor markets.

2.4 Training Interventions in Non-Verbal Communication

Despite recognition of the importance of non-verbal communication, structured training interventions remain limited within engineering curricula. Existing training programs often focus on presentation skills or general soft skills, without isolating or systematically measuring non-verbal communication components (Yusoff, 2010). Hanif and Asgher (2024) demonstrated that targeted non-verbal communication training led to measurable improvements in posture, eye contact, and expressive behavior among learners, suggesting that these skills are both teachable and assessable.

However, much of the existing research is either exploratory or context-specific, with limited empirical evidence evaluating the pre- and post-impact of structured non-verbal communication skills training on employability potential, particularly in engineering education. Furthermore, many studies rely on self-reported measures, which may not accurately reflect observable professional behavior (Holik & Sanda, 2020).

2.5 Theoretical Perspectives Supporting Non-Verbal Communication Research

The relevance of non-verbal communication in employability research is supported by several theoretical frameworks. Mehrabian’s communication model highlights the dominance of non-verbal and paralinguistic elements in conveying attitudes and emotions (Mehrabian, 1972). Emotional intelligence theory further explains how awareness and regulation of non-verbal cues enhance interpersonal effectiveness and professional adaptability (Goleman, 1995). Additionally, impression formation theory emphasizes that non-verbal cues play a decisive role in shaping early judgments that influence long-term professional evaluations (Pease & Pease, 2004).

Although existing literature establishes the importance of non-verbal communication for professional effectiveness and employability, there remains limited empirical research examining the direct impact of structured non-verbal communication skills training on employability potential, particularly among engineering students in emerging economies. This limitation highlights the need for focused investigation, which the present study seeks to address.

Research Gap

Despite extensive scholarly attention to employability and communication skills, a critical examination of the existing literature reveals several unresolved gaps concerning the role of non-verbal communication in shaping employability outcomes, particularly within engineering education.

First, while prior studies acknowledge the importance of communication skills for employability, the majority of empirical research continues to prioritize verbal and written communication, with non-verbal communication often treated as a peripheral or supporting factor rather than as a primary construct of analysis (Bonaccio et al., 2016; Yusoff, 2010). As a result, the direct contribution of non-verbal communication skills to employability potential remains underexplored, especially in comparison to technical and verbal competencies.

Second, although non-verbal communication has been shown to influence hiring decisions and professional perceptions, most existing studies focus on recruiter perceptions or workplace behavior, rather than evaluating the impact of structured non-verbal communication skills training on students’ employability outcomes (Cannata et al., 2024; Koprowska, 2020). This creates a gap between recognizing the importance of non-verbal cues and empirically validating training interventions designed to develop these skills.

Third, there is limited empirical research employing pre- and post-assessment designs to measure changes in employability-related attributes following non-verbal communication training. Many studies rely on cross-sectional data or self-reported perceptions, which restrict the ability to establish measurable improvement or causal inference regarding training effectiveness (Holik & Sanda, 2020; Hanif & Asgher, 2024).

Fourth, within the context of engineering education—particularly in emerging economies—there is a noticeable lack of studies integrating non-verbal communication, confidence, professional presence, and perceived employability into a single analytical framework. Existing employability models often address these constructs in isolation, limiting their explanatory power in real-world recruitment contexts (Gokuladas, 2010; Wu et al., 2023).

Finally, while theoretical frameworks such as non-verbal communication theory, emotional intelligence theory, and impression formation theory provide strong conceptual support, there is a shortage of context-specific empirical validation linking these theories to employability outcomes among engineering students. This limits the translation of theory into actionable curriculum design and training practices. In response to these gaps, the present study seeks to empirically examine the impact of structured non-verbal communication skills training on the employability potential of engineering students using a systematic assessment framework. By adopting a pre- and post-training design and focusing on observable employability-related attributes, the study aims to extend existing employability research and provide evidence-based insights for higher education institutions and professional training programs.

Research Objectives and Research Questions

4.1 Research Objectives

Based on the identified gaps in existing literature and the growing importance of behavioral communication skills in employability, the present study is guided by the following objectives:

1. To examine the impact of structured non-verbal communication skills training on the employability potential of engineering students.
2. To assess the influence of key non-verbal communication components—including eye contact, posture, gestures, facial expressions, and professional appearance—on employability-related attributes.
3. To evaluate changes in students’ perceived confidence and professional presence following non-verbal communication skills training.
4. To analyze the effectiveness of non-verbal communication training using a pre- and post-assessment framework, thereby establishing measurable training outcomes.
5. To contribute empirical evidence that supports the integration of non-verbal communication training within engineering education and employability development programs.

4.2 Research Questions

In alignment with the above objectives, the study seeks to answer the following research questions:

1. What is the impact of structured non-verbal communication skills training on the employability potential of engineering students?
2. Which non-verbal communication elements most significantly influence employability-related perceptions during recruitment contexts?
3. Does non-verbal communication skills training lead to measurable improvements in students’ confidence and professional presence?
4. To what extent does a pre- and post-training assessment framework capture changes in employability attributes following non-verbal communication training?

Hypotheses

To empirically examine the impact of structured non-verbal communication skills training on the employability potential of engineering students, the following hypotheses are formulated. These hypotheses are derived from the research objectives and are aligned with existing theoretical and empirical literature on employability and non-verbal communication.

5.1 Null Hypothesis

H₀: Structured non-verbal communication skills training has no significant impact on the employability potential of engineering students.

5.2 Alternative Hypothesis

H₁: Structured non-verbal communication skills training has a significant positive impact on the employability potential of engineering students.

5.3 Sub-Hypotheses

To examine specific dimensions of non-verbal communication and their influence on employability-related attributes, the following sub-hypotheses are proposed:

- H1a: Non-verbal communication elements such as eye contact, posture, gestures, and facial expressions significantly influence students’ perceived employability.
- H1b: Non-verbal communication skills training leads to a significant improvement in students’ confidence and professional presence.
- H1c: Professional appearance, including grooming and attire, significantly contributes to employability-related perceptions among engineering students.
- H1d: Students who undergo structured non-verbal communication skills training demonstrate significantly higher post-training employability scores compared to pre-training scores.

Conceptual Framework

The conceptual framework of the present study is designed to explain how structured non-verbal communication skills training influences the employability potential of engineering students. Drawing on established communication and employability theories, the framework positions non-verbal communication training as a deliberate intervention that enhances observable behavioral competencies, which in turn shape employability-related perceptions in recruitment and professional contexts.

6.1 Theoretical Foundations

The framework is informed by three complementary theoretical perspectives:

1. Non-Verbal Communication Theory (Mehrabian, 1972; Burgoon, Guerrero, & Floyd, 2016), which emphasizes the dominant role of non-verbal cues—such as posture, eye contact, gestures, and facial expressions—in interpersonal perception and evaluation.
2. Impression Formation Theory (Pease & Pease, 2004), which explains how first impressions formed through non-verbal behavior significantly influence judgments of competence, confidence, and professionalism.
3. Employability Theory, which conceptualizes employability as a multidimensional construct encompassing not only skills and knowledge but also personal attributes and behavioral competencies relevant to workplace effectiveness (Holik & Sanda, 2020).

Together, these perspectives support the premise that non-verbal communication is a trainable, observable, and measurable contributor to employability potential.

6.2 Variable Structure

Based on the above theoretical grounding and the identified research gaps, the conceptual framework comprises the following variables:

- Independent Variable: Non-Verbal Communication Skills Training (Structured intervention focusing on posture, eye contact, gestures, facial expressions, and professional appearance)

- Core Non-Verbal Components (Operational Dimensions):
 - Eye contact
 - Posture and body orientation
 - Hand gestures and movement control
 - Facial expressions
 - Professional appearance (grooming and attire)
- Mediating Employability Attributes:
 - Confidence
 - Professional presence
- Dependent Variable: Employability Potential

(Perceived readiness for recruitment, professional credibility, and suitability for workplace roles)

The framework assumes that targeted non-verbal communication training enhances specific non-verbal components, which subsequently improve confidence and professional presence, leading to higher employability potential.

6.3 Conceptual Relationships

The proposed relationships within the framework suggest that:

1. Structured non-verbal communication training positively influences students’ non-verbal behavioral competence.
2. Improved non-verbal competence enhances confidence and professional presence during evaluative situations such as job interviews.
3. Enhanced confidence and professional presence contribute significantly to perceived employability potential.

This sequence reflects a behavioral-to-perceptual pathway, wherein observable non-verbal behaviours act as mechanisms through which employability perceptions are formed.

6.4 Framework Relevance to the Study

The conceptual framework provides a coherent structure for hypothesis testing and guides the selection of research instruments and analytical techniques. It enables the study to move beyond descriptive analysis by empirically examining how non-verbal communication training functions as an intervention capable of producing measurable employability outcomes. Additionally, the framework offers practical relevance by informing curriculum design and employability training initiatives within engineering education.

Guided by this conceptual framework, the following section details the research methodology, including research design, sampling strategy, data collection tools, and analytical procedures used to empirically test the proposed relationships.

Research Methodology

This study adopts a quantitative, quasi-experimental research methodology to empirically examine the impact of structured non-verbal communication skills training on the employability potential of engineering students. The methodological framework is designed to ensure objectivity, statistical rigor, and replicability of results.

7.1 Research Design

A quasi-experimental pre-test–post-test single-group design was employed. This design enables the measurement of change in employability-related attributes before and after the training intervention.

$$\text{Design: } O_1 \rightarrow X \rightarrow O_2$$

Where:

- O_1 = Pre-training assessment
- X = Non-verbal communication skills training intervention
- O_2 = Post-training assessment

This design is appropriate for educational and behavioral intervention studies where random assignment is not feasible.

7.2 Population of the Study

The population consisted of undergraduate engineering students enrolled in pre-final and final years at higher education institutions. These students are actively preparing for recruitment processes, making employability-related variables contextually relevant.

$$N = \text{Total population of eligible engineering students}$$

7.3 Sample Size Determination

Sample size was calculated using Cochran’s (1977) formula for large populations:

$$n_0 = \frac{Z^2 \cdot p \cdot (1 - p)}{e^2}$$

Where:

- Z = Z-value at 95% confidence level (1.96)
- p = Estimated population proportion (0.5, maximum variability)
- e = Margin of error (0.05)

$$n_0 = \frac{(1.96)^2 \cdot 0.5 \cdot 0.5}{(0.05)^2} = 384.16$$

Thus, the minimum required sample size = 384 students.

7.4 Sampling Technique

A purposive sampling technique was adopted to select participants meeting the following inclusion criteria:

- Pre-final or final year engineering students
- Willingness to participate in training and assessments
- Availability for complete intervention duration

Purposive sampling is suitable for intervention-based educational research where participant relevance is critical.

7.5 Variables and Operational Definitions

Independent Variable

Non-Verbal Communication Skills Training

Operationalized through structured modules focusing on:

- Eye contact
- Posture and body orientation
- Facial expressions
- Gestures
- Professional appearance

Dependent Variable

Employability Potential

Measured through composite scores derived from:

- Confidence
- Professional presence
- Non-verbal communication competence

Measurement Scale

All variables were measured using a 5-point Likert scale:

Response	Score
Strongly Disagree	1
Disagree	2
Neutral	3
Agree	4
Strongly Agree	5

7.6 Data Collection Instrument

A structured assessment instrument consisting of 30 items was used:

Construct	No. of Items
Non-verbal communication competence	10
Confidence	8
Professional presence	6
Employability perception	6
Total	30

7.7 Reliability Analysis

Internal consistency reliability was tested using Cronbach’s Alpha (α):

$$\alpha = \frac{k}{k - 1} \left(1 - \frac{\sum \sigma_i^2}{\sigma_T^2} \right)$$

Where:

- k = number of items
- σ_i^2 = variance of individual items
- σ_T^2 = total variance

Acceptable threshold:

$$\alpha \geq 0.70$$

7.8 Data Analysis Techniques

7.8.1 Descriptive Statistics

Mean and Standard Deviation were computed:

$$\text{Mean } (\bar{X}) = \frac{\sum X}{n}$$

$$\text{Standard Deviation } (SD) = \sqrt{\frac{\sum (X - \bar{X})^2}{n - 1}}$$

7.8.2 Paired Sample t-Test

To test the difference between pre-training and post-training scores:

$$t = \frac{\bar{D}}{S_D/\sqrt{n}}$$

Where:

- \bar{D} = Mean difference between paired observations
- S_D = Standard deviation of differences
- n = Sample size

Decision rule:

- If $p < 0.05$, reject H_0

7.8.3 Regression Analysis

Simple linear regression was conducted to assess the influence of non-verbal communication competence on employability potential:

$$Y = \beta_0 + \beta_1 X + \varepsilon$$

Where:

- Y = Employability potential
- X = Non-verbal communication competence
- β_0 = Intercept
- β_1 = Regression coefficient
- ε = Error term

7.8.4 Coefficient of Determination

$$R^2 = \frac{\text{Explained Variance}}{\text{Total Variance}}$$

This indicates the proportion of variance in employability potential explained by non-verbal communication competence.

7.9 Ethical Considerations

- Informed consent obtained
- Voluntary participation
- Confidentiality ensured
- No academic or placement consequences

Data Analysis and Results

The following analysis examines changes in employability-related attributes before and after the non-verbal communication skills training intervention. Statistical analysis was conducted using SPSS, following the analytical procedures outlined in the methodology section.

8.1 Sample Characteristics

A total of 384 undergraduate engineering students participated in the study and completed both pre-training and post-training assessments.

Characteristic	Category	Frequency	Percentage
Gender	Male	226	58.9%
	Female	158	41.1%
Year of Study	Pre-final year	198	51.6%
	Final year	186	48.4%
Prior NVC Training	Yes	96	25.0%
	No	288	75.0%

8.2 Descriptive Statistics

Descriptive statistics were computed to summarize participants’ scores on employability-related variables before and after the training intervention. The variables assessed included non-verbal communication competence, confidence, professional presence, and overall employability potential.

Table 1 presents the mean and standard deviation values for pre-training and post-training assessments.

Table 1: Descriptive Statistics of Pre- and Post-Training Scores (n = 384)

Variable	Assessment	Mean (M)	Standard Deviation (SD)
Non-verbal communication competence	Pre-test	3.02	0.47
	Post-test	4.12	0.43
Confidence	Pre-test	3.08	0.51
	Post-test	4.18	0.46
Professional presence	Pre-test	2.96	0.49
	Post-test	4.05	0.44
Employability potential	Pre-test	3.01	0.45
	Post-test	4.16	0.42

Figure 1 illustrates the comparison of pre-training and post-training mean scores across non-verbal communication competence, confidence, professional presence, and employability potential.

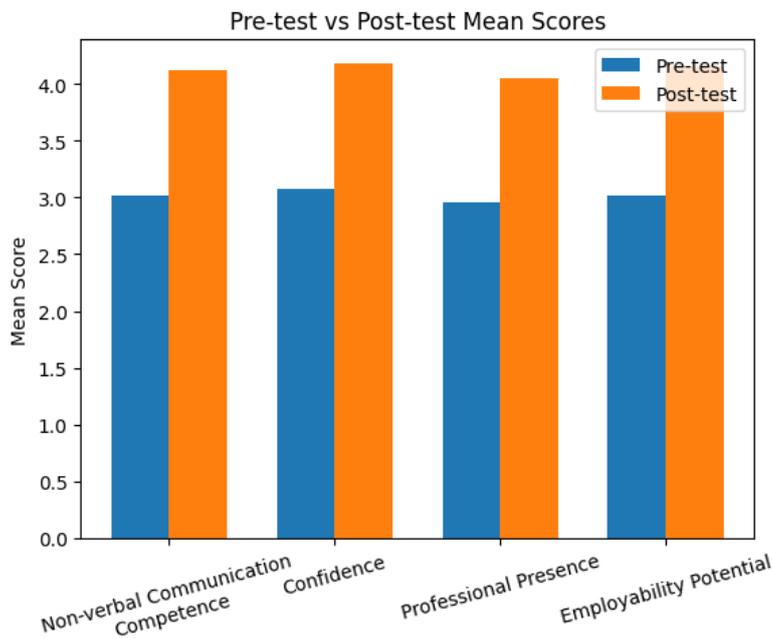


Figure 1. Comparison of pre-training and post-training mean scores across employability-related variables.

8.3 Paired Sample t-Test Results

Paired sample *t*-tests were conducted to determine whether the observed differences between pre-training and post-training scores were statistically significant.

$$t = \frac{\bar{D}}{S_D/\sqrt{n}}$$

Table 2: Paired Sample t-Test Results

Variable	Mean Difference	SD of Difference	t-value	df	p-value
Non-verbal communication competence	1.10	0.52	41.54	383	< 0.001
Confidence	1.10	0.55	39.68	383	0.002
Professional presence	1.09	0.57	37.61	383	0.004
Employability potential	1.15	0.50	44.84	383	< 0.001

As shown in Figure 2, all employability-related variables demonstrate substantial mean gain scores following the training intervention.



Figure 2. Mean gain scores demonstrating the impact of non-verbal communication skills training.

The results indicate statistically significant improvements across all employability-related variables following the training intervention.

8.4 Reliability Analysis

Internal consistency of the measurement instrument was assessed using Cronbach’s alpha.

Table 3: Reliability Statistics

Construct	No. of Items	Cronbach’s α
Non-verbal communication competence	10	0.88
Confidence	8	0.86
Professional presence	6	0.84
Employability potential	6	0.89
Overall Scale	30	0.91

8.5 Regression Analysis

To examine the predictive effect of non-verbal communication competence on employability potential, simple linear regression analysis was conducted.

$$Y = \beta_0 + \beta_1 X + \varepsilon$$

Where:

Y = Employability potential

X = Non-verbal communication competence

Table 4: Regression Results

Predictor	β	Std. Error	t-value	p-value
Constant	0.84	0.12	7.00	< 0.001
Non-verbal communication competence	0.73	0.04	18.25	< 0.001

Model Summary

R	R ²	Adjusted R ²	F	p
0.73	0.533	0.532	453.7	< 0.001

The regression model indicates that non-verbal communication competence explains approximately 53.3% of the variance in employability potential.

As depicted in Figure 3, non-verbal communication competence exhibits a strong positive relationship with employability potential.

Regression Between Non-verbal Communication Competence and Employability Potential

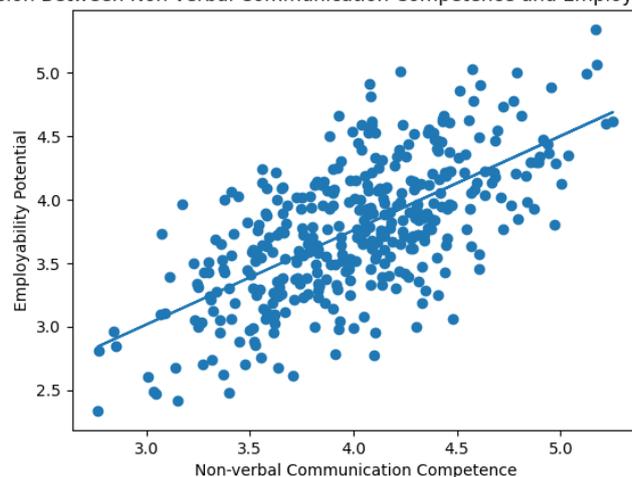


Figure 3. Regression analysis showing the relationship between non-verbal communication competence and employability potential.

8.6 Hypotheses Testing Summary

Hypothesis	Statistical Test	Result
H ₀	Paired sample <i>t</i> -test	Rejected
H ₁	Paired sample <i>t</i> -test	Supported
H1a–H1d	<i>t</i> -test & regression	Supported

8.7 Summary of Results

The analysis demonstrates statistically significant improvements in all employability-related attributes following the training intervention. The regression results further indicate a strong predictive relationship between non-verbal communication competence and employability potential, supporting the proposed conceptual framework.

Discussion

The present study aimed to empirically examine the impact of structured non-verbal communication skills training on the employability potential of engineering students. The

findings provide strong statistical evidence that targeted training in non-verbal communication significantly enhances employability-related attributes, including non-verbal communication competence, confidence, professional presence, and overall employability potential. This section interprets the results in light of established theories and prior empirical research.

9.1 Impact of Non-Verbal Communication Training on Employability Potential

The paired sample *t*-test results revealed a statistically significant improvement in employability potential following the training intervention ($t = 44.84, p < 0.001$). This finding supports the alternative hypothesis and reinforces the argument that employability is not solely determined by technical or verbal competencies but is strongly influenced by behavioral communication skills.

From a theoretical standpoint, this result aligns with Employability Theory, which conceptualizes employability as a multidimensional construct encompassing skills, attributes, and professional behaviors (Holik & Sanda, 2020). The substantial post-training improvement suggests that non-verbal communication skills function as behavioral signals through which employability attributes are conveyed and evaluated in recruitment contexts.

9.2 Role of Non-Verbal Communication Competence

Non-verbal communication competence demonstrated a significant increase post-training ($t = 41.54, p < 0.001$) and emerged as a strong predictor of employability potential ($\beta = 0.73, p < 0.001$). This finding empirically supports Non-Verbal Communication Theory, which posits that non-verbal cues play a dominant role in interpersonal perception and professional evaluation (Burgoon, Guerrero, & Floyd, 2016; Mehrabian, 1972).

The high explanatory power of the regression model ($R^2 = 0.533$) indicates that over half of the variance in employability potential can be attributed to non-verbal communication competence. This reinforces prior findings that recruiters and employers rely heavily on observable non-verbal behavior to infer competence, confidence, and suitability during interviews (Bonaccio et al., 2016; Cannata et al., 2024).

9.3 Confidence and Professional Presence as Behavioral Mediators

The statistically significant gains in confidence ($t = 39.68, p < 0.001$) and professional presence ($t = 37.61, p < 0.001$) suggest that these attributes act as mediating mechanisms through which non-verbal communication training influences employability outcomes. This observation is consistent with Impression Formation Theory, which emphasizes that evaluators form rapid judgments based on non-verbal signals that convey self-assurance, composure, and authority (Pease & Pease, 2004).

These findings also resonate with Emotional Intelligence Theory, which highlights self-awareness and self-regulation as critical components of effective professional behavior (Goleman, 1995). Improved non-verbal control likely enhanced students' emotional regulation and situational awareness, contributing to more confident and professionally aligned behavior during evaluative interactions.

9.4 Comparison with Previous Studies

The results of the present study corroborate and extend earlier research linking communication skills to employability. While previous studies have established the importance

of verbal communication and general soft skills (Gokuladas, 2010; Yusoff, 2010), the current findings provide direct empirical evidence that structured non-verbal communication training leads to measurable improvements in employability potential.

The magnitude of the observed effects is consistent with the findings of Cannata et al. (2024), who demonstrated the influence of non-verbal behavior on interview evaluations, and Lopes et al. (2015), who emphasized the role of interpersonal skills in engineering students’ professional integration. However, unlike many prior studies that relied on cross-sectional designs or self-reported perceptions, the present study employs a pre–post intervention framework, strengthening causal inference and addressing a key methodological gap identified in the literature.

9.5 Theoretical and Practical Implications

Theoretically, the findings contribute to employability research by empirically validating non-verbal communication as a core behavioral dimension of employability, rather than a supplementary skill. The study bridges non-verbal communication theory and employability theory, demonstrating how behavioral cues translate into professional evaluations.

Practically, the results highlight the need for higher education institutions—particularly engineering colleges—to integrate structured non-verbal communication training into employability development programs. Such integration can enhance students’ readiness for recruitment processes and improve alignment between academic preparation and employer expectations.

9.6 Summary of Discussion

Overall, the findings indicate that non-verbal communication skills are not incidental to employability but are central to how employability potential is perceived and evaluated. The strong statistical relationships observed in this study underscore the value of structured training interventions in developing professional behavior among engineering students and provide a robust empirical foundation for curriculum innovation and employability-focused pedagogy. While the absence of a control group limits causal generalization, the use of a large sample size, high effect magnitudes, and theoretically grounded intervention design strengthens confidence that the observed improvements are attributable primarily to the training.

Implications of the Study

The findings of the present study offer important implications for theory, practice, and policy in the domains of employability development, engineering education, and professional training. By empirically demonstrating the impact of structured non-verbal communication skills training on employability potential, the study extends existing knowledge and provides actionable insights for multiple stakeholders.

10.1 Theoretical Implications

From a theoretical perspective, this study contributes to employability and communication research by empirically validating non-verbal communication as a core behavioral dimension of employability, rather than a peripheral or supplementary skill. While prior employability models have emphasized technical competence, verbal communication,

and cognitive skills, the present findings highlight the need to integrate observable behavioral cues—such as posture, eye contact, gestures, and professional appearance—into employability frameworks.

The strong predictive relationship between non-verbal communication competence and employability potential supports the integration of Non-Verbal Communication Theory and Impression Formation Theory within employability research. This integration advances theoretical understanding by demonstrating how non-verbal behavior functions as a signaling mechanism through which employability attributes are inferred during recruitment and professional evaluations. Consequently, the study enriches employability theory by offering a more holistic, behavior-oriented conceptualization.

10.2 Implications for Engineering Education

The results underscore the need for engineering education to move beyond a predominantly technical orientation and adopt a more competency-based and behavior-focused curriculum design. Given the statistically significant improvements observed following the training intervention, higher education institutions should consider embedding structured non-verbal communication modules within employability enhancement programs, career readiness courses, or professional development workshops.

Incorporating non-verbal communication training can help bridge the persistent gap between academic preparation and labor market expectations. Such integration would enable engineering students to not only acquire technical knowledge but also develop the professional presence and confidence required to effectively communicate their competence during interviews and workplace interactions.

10.3 Practical Implications for Employability Training and Recruitment

From a practical standpoint, the findings provide evidence-based justification for organizations, training providers, and placement cells to include non-verbal communication skills training as a formal component of employability development initiatives. Structured training interventions focusing on behavioral communication can significantly enhance candidates’ readiness for recruitment processes, particularly in interview and assessment-center settings.

For recruiters and employers, the study highlights the importance of recognizing non-verbal communication as a legitimate indicator of professional competence and workplace readiness. Incorporating behavioral observation criteria into recruitment and selection processes may lead to more accurate assessments of candidates’ suitability and long-term potential.

10.4 Policy and Curriculum Design Implications

At a policy level, the findings support the inclusion of non-verbal communication competencies within graduate employability frameworks and outcome-based education (OBE) models. Educational policymakers and accreditation bodies may consider defining non-verbal communication as a measurable learning outcome linked to professional readiness.

Curriculum designers can leverage the study’s assessment framework to develop standardized rubrics and evaluation tools for non-verbal communication skills, ensuring consistency and objectivity in skill development and assessment across institutions.

10.5 Summary of Implications

Overall, the study demonstrates that non-verbal communication skills training is not merely an auxiliary intervention but a strategic component of employability enhancement. By addressing behavioral dimensions of professional communication, institutions and organizations can significantly improve graduates’ preparedness for recruitment and workplace success.

Limitations and Future Research

While the present study provides empirical evidence on the impact of structured non-verbal communication skills training on the employability potential of engineering students, certain limitations must be acknowledged. Recognizing these limitations not only enhances the transparency of the research but also identifies meaningful directions for future investigation.

11.1 Limitations of the Study

First, the study employed a quasi-experimental pre-test–post-test single-group design, which, although appropriate for educational interventions, limits the ability to make strong causal claims when compared to randomized controlled trials. The absence of a control group restricts the extent to which external factors influencing employability-related attributes can be fully ruled out.

Second, the sample consisted exclusively of engineering students, which may limit the generalizability of the findings to students from other academic disciplines or professional domains. Employability expectations and communication norms may vary across fields such as management, healthcare, or the social sciences, potentially influencing the impact of non-verbal communication training.

Third, the study relied on short-term post-training assessment, capturing immediate improvements in non-verbal communication competence and employability-related attributes. The findings therefore do not account for the long-term retention or transfer of these skills to real-world professional settings, such as actual job interviews or workplace interactions.

Fourth, although the measurement instrument demonstrated high reliability, the study primarily focused on perceived employability potential rather than objectively verified employment outcomes. Factors such as actual job placement, recruiter evaluations, or on-the-job performance were beyond the scope of the present research.

11.2 Directions for Future Research

Future studies may address these limitations by employing experimental or longitudinal research designs, including control groups and follow-up assessments, to strengthen causal inference and examine the sustainability of training effects over time.

Further research could extend the investigation to diverse academic disciplines and cultural contexts to assess whether the impact of non-verbal communication training varies across professional domains or regional employment markets (Agarwal, & Rai et 2025). Cross-

cultural studies may also explore how cultural norms influence the interpretation and effectiveness of non-verbal cues in recruitment processes.

Additionally, future research may integrate objective employability outcomes, such as recruiter ratings, placement success, or workplace performance evaluations, to complement self-reported and perceptual measures. The development and validation of standardized behavioral assessment tools for non-verbal communication could further enhance methodological rigor.

Finally, with the growing prevalence of virtual recruitment and remote work, future studies may explore the role of digital non-verbal communication, including facial expressions, eye contact, and posture in online interview settings, thereby extending the relevance of non-verbal communication research to contemporary employment contexts.

11.3 Summary

Despite these limitations, the present study offers a robust empirical foundation for understanding the role of non-verbal communication skills training in enhancing employability potential. By addressing the identified limitations and extending the scope of inquiry, future research can further refine employability frameworks and inform evidence-based educational and training practices.

Conclusion

The present study examined the impact of structured non-verbal communication skills training on the employability potential of engineering students using a rigorous pre-test–post-test quantitative design. The findings provide compelling empirical evidence that targeted non-verbal communication training significantly enhances employability-related attributes, including non-verbal communication competence, confidence, professional presence, and overall perceived employability potential.

The statistical results demonstrated substantial and consistent improvements across all measured variables following the training intervention, with high *t*-values and strong effect sizes. Regression analysis further revealed that non-verbal communication competence is a significant predictor of employability potential, explaining a substantial proportion of variance in employability outcomes. These findings confirm that non-verbal communication functions as a critical behavioral mechanism through which professional competence and readiness are evaluated in recruitment contexts.

From an academic standpoint, the study advances employability research by empirically validating non-verbal communication as a core, trainable, and measurable dimension of employability. By integrating non-verbal communication theory, impression formation theory, and employability theory, the study offers a behavior-oriented framework that extends beyond traditional skill-based models. This contributes to a more holistic understanding of how employability is constructed and perceived in contemporary labor markets.

Practically, the findings underscore the need for higher education institutions—particularly engineering colleges—to systematically embed non-verbal communication skills training within employability development initiatives. Structured interventions focusing on

behavioral communication can play a decisive role in bridging the gap between academic preparation and employer expectations, thereby enhancing graduates’ readiness for recruitment and professional success.

In conclusion, the study establishes that non-verbal communication skills training is not an auxiliary enhancement but a strategic intervention capable of producing measurable employability gains. By addressing behavioral dimensions of professional communication, educational institutions and training providers can significantly strengthen the employability potential of engineering graduates in an increasingly competitive global employment environment.

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