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Engineering Students' Communication Skills, Their Socio-economic Backgrounds and Academic Excellence

O.T. Remadevi [a], Dr. V. Ravi Kumar [b]

[a] *Research Scholar, Research and Development Centre, Bharathiar University, Coimbatore-641046, Tamil Nadu, India.*

[b] *Professor, CMS Institute of Management Studies, Coimbatore-641049.*

Abstract

Abstract: The research article has underlined the prominence of communication skills of students in the current scenario. Studying a sample of 619 final year engineering students in Ernaulam District, Kerala State, India, the authors have investigated and presented their communication abilities. The research tool employed is a pre-tested questionnaire. Reliability of the items were found to be acceptable with a Cronbach's alpha value of 0.753. The variables studied were: the skill levels of students, socio-economic background, parental education and academic excellence in the engineering examinations. The findings have shown that the students have 'moderate' to 'good' level of communication skills. These skills varied significantly with respect to their socio economic background and mother's as well as father's educational levels. There were no significant variations in the skill levels with regard to students' academic excellence.

Keywords: Communication skills; Engineering students, Socio-economic background; Parental education, Academic Excellence

I. Introduction

The skill to communicate effectively is one of the prerequisites in every walk of life. The requirement becomes even more, when it is applicable to students. Researchers, employers, the academicians and the policy makers have been stressing on this fact for quite some time. Its relevance is of growing importance as one enters the employment scenario, irrespective of the profession one is engaged in. The ability to communicate in English is considered as one of the essential skills to achieve one's dream career, in today's globalised world. Gone are the days where the emphasis was on basic skills in 'Reading, wRiting and aRithmetic (popularly known as the three R's). The gamut now stands expanded and includes much more; ability to express oneself clearly, to speak to a group and such other competencies of oral communication, are among the much sought-after capabilities. Add to this, the art of listening and the skill to make use of information technology. From salesman to the marketing head, from travel and tourism guide to the top business magnate, from the site supervisor to the head, you need these essential deliverables with you, to step in as well as to succeed in your profession.

As one enters higher education, for instance, the engineering education, enhanced demand is discernible with regard to one's ability in interacting with colleagues, in negotiating, in problem-solving and in decision making. Team-based work settings, project mode of operations, large scale outsourcing of work components, innovations, constant and rapid changes the world over- all these call for special competencies with their roots in effective communication. Since a majority of international players have English as their business language, fluency in it adds to one's kitty of merits.

The study presented here forms part of a detailed research work on the employability skills of engineering students. The focus here is on the communication skills of engineering students, with emphasis on three aspects: a) the skill levels of engineering students, b) skill variations among these students on account of their different socio-economic background and c) skill variations with respect to their academic achievements at their engineering examinations.

II. Literature Review

The literature presented below gives a brief account of relevant research on the importance of communication skills as per the perceptions of employers, students and the faculty. Research on communication skill gaps has also been included. Besides these, findings on the association between students' socio-economic background and employability skills, and between their academic achievement and employability skills, are also given.

Employer satisfaction with Information Technology (ICT) graduates was studied by Hagan (2004). The attributes employers valued were also included in the study. General satisfaction was stated by the employers. Top attributes listed by the employers, among others, included written and oral communication skills, interpersonal communication, being able to articulate and also to listen, and customer skills- dealing with difficult customers and keeping them informed and happy. Omari and Palmer (2006) found the communication skill set as the most useful one for employment. Felstead et al. (2007) revealed that 74 per cent of jobs were using horizontal communication at their work places. Findings by Atfield and Purcell (2010) also highlight the importance of communication skills. P'Rayan

(2011) investigated students' as well as employers' perception of skills they considered important for placement. Both groups had listed communication skill among the important ones. Students had highlighted the importance of Listening skills, English speaking skills, English writing skills and English grammar, in securing placements. Sekar (2011) has found communication skills as the foremost in the employability skill set.

Research by Surya (2012), however, has a different view. While studying the perceptions of lecturers and students, the study found that while oral communication was rated among the priority items by the lecturers, communication skill was the lowest priority as per the students' perception.

According to Blom & Saeki (2011), of the World Bank, the employers have reported communication Skill as 'very Important' among other employability skills. The International Labor Organisation (ILO 2011) report on G20 Training Strategy for a Skilled Workforce, has identified communication skill as one of the essential and useful skills to cope up with the rapid global changes. Investigations by the Wheelbox (2014), through one hundred employers from ten industry sectors, have identified communication skills among the preferred attributes. ABET (2014-2015) specifies the ability to 'communicate effectively' as one capability that the engineering graduate is expected to demonstrate.

P'Rayan & Shetty (2008), in their observations with engineering students, divulged that the communication skills of majority of these students were below average. The researchers had studied the speaking skills as well as the Communication skill apprehension (CA) of the students. The apprehension to communicate was very evident in areas such as public speaking, meetings, interpersonal communication and group discussion, as per the study results. Bhattacharya (2011) studied students from Tripura, India and revealed that the communication skill s of 70-85 per cent were below the desired level. Nabi (2013) has noticed communication skill inadequacies among students of management programme in Aligarh, India. The main areas in which the students had difficulty were, verbal communication with persons within the organization as well as outside the organization, information gathering and processing, and creating/editing reports.

Studies have observed that students' socio- economic backgrounds are closely related to their employability skills; the higher the socio-economic background, the higher is the students' skill levels, they argue (Blasco, 2002; Jariene & Razmantiene, 2006).

Nair & Ghosh (2006) are of the opinion that the Grade Point Average (GPA) of students does not affect their placements. Studies by Gokaldas (2009) and Omar et al. (2012) also did not find any significant difference in the employability skills related to academic achievement.

III. Methodology

Study sample: Final year engineering students from five engineering colleges in Ernakulam District, Kerala State, India, were selected for the study through multi-stage sampling. The sample size is 619, comprised of fourteen batches in all. The students, during the time of data collection, were in the academic year 2014-2015.

Data Collection: Primary data collection was by means of survey method using a self-assessment questionnaire. The section related to communication skills, had nine statements. A few of these statements were developed based on the format 'Assessing Employability' prepared by the University of Kent. Five-point Liker scale was used to assess students' abilities in various aspects of communication. The scale values ranged from one to five, with one corresponding to the lowest score and five the highest score. Scores for negative statements were reversed while analyzing the data. The questionnaire was pre-tested for clarity, simplicity, internal consistency and validity. Based on the pre-test responses, modifications were effected and the final tool had the statements both in English and Malayalam (the regional language in Kerala State). Reliability test using Cronbach's alpha indicated a value of 0.753. Cronbach's alpha is generally considered as one of the widely used objective measures of reliability (Tavakol and Dennick, 2011). The alpha value above 0.7 is an acceptable one (Malhotra, 2004). Validity was ensured through expert opinion involving employers and faculty. Secondary sources such as government reports and reference materials were also used.

The questionnaire was administered directly to the students' in their classrooms. The study and purpose was briefly introduced and students were requested to give their responses frankly and honestly. Doubts were cleared then and there. The time taken by one batch of students, for the whole questionnaire, (including other skill sets and variables) ranged from 25 minutes to 40 minutes.

IV. Research Questions:

- Do the graduating engineers possess good communication skills so that they could be satisfactorily employed?
- Are there variations in the communication skills of graduating engineers on account of their different socio-economic backgrounds? Are there variations in the communication skills of these students with respect to their parental education?
- Are there variations in the communication skills of graduating engineers with respect to their academic excellence in the engineering examinations?

In order to find answers to these research questions, the following hypotheses have been framed:

1. The communication skills of graduating engineers, on an average, are good.
2. The communication skills of graduating engineers do not differ significantly with respect to their socio-economic characteristics.
3. The communication skills of graduating engineers do not differ significantly with respect to their parental education
4. The communication skills of graduating engineers do not differ significantly with respect to their academic excellence in their engineering examinations.

V. Results:

The tables and explanations that follow, depict:

a) The communication skill levels of the graduating engineering students and their comparison with those at the 'good' level.

b) Their communication skill variations with respect to: b1) their socio-economic characteristics and the results of analysis of variance confirming the significance of these variations, and b2) their parental (mother's as well as father's) educational levels and the results of analysis of variance, confirming these variations.

c) Their communication skill variations with respect to their academic excellence in the engineering examination (up to sixth semester) and the't' test results inferring the significance of these variations.

1. Communication Skill Level:

Table 1 Communication Skills Assessment Score

Sino.	Statements	Mean (N:619)	S.D
1	I can speak English fluently	3.86	.77
2	I can express my ideas clearly when speaking	3.70	.78
3	I find it difficult to develop my ideas easily in writing (in English)	3.46	1.12
4	I have some difficulty in speaking to an audience	2.78	1.15
5	I feel nervous when asked to give class presentations	2.77	1.21
6	I find it difficult to express myself well in the required situations	2.80	1.07
7	I have learnt the required technology to communicate	3.43	.98
8	I can use the technology effectively while communicating	3.39	.91
9	I am not very good at listening to others	3.76	1.08
Overall		**29.97**	**5.28**
Skill Set Average		**3.33**	**0.59**

Scale: 5-Strongly Agree, 4- Agree; 3-Neither Agree nor Disagree;

2- Disagree; 1-Strongly Disagree (Score reversed for negative statements)

From Table 1, we could observe that the students appear to possess moderate to good level abilities, to speak fluently, to express their ideas and also to use information technology for communication. Their listening skills are also above average. On the other hand, their abilities in speaking to an audience, in giving class presentations, and in expressing themselves in the required situations are at a lower level.

H1. The communication skills of engineering students, on an average, are good.

Table 2 Mean Scores for Communication Skills with those for level 'good'.*

One sample test

Skill Description	Mean Score	N	S.D	t	df	Sig.
Communication skills	3.33	619	0.59	28.409	618	**
Communication skills- good	4.00					

*Score 4 and above: level 'good' to 'very good'. ** Significant at 0.01 level.

Inference: Engineering students do not possess communication skills at level 'good'. Hence the hypothesis that they, on an average, possess 'good' communication skills, is rejected. Their skill levels are below the level 'good'.

2. Communication skills analyzed with respect to students' socio-economic background

The sub factors analyzed are: socio-economic characteristics of the student's family and the educational level of their parents,

2.1 Communication Skills by socio-economic characteristics of student's family

Table 3 presents the distribution of students grouped into four categories according to their socio-economic characteristics. Among the minorities category, those who were economically weak were included under those based on family income and eligibility for fee concession.

The communication skill scores as per their self-assessment are given and the "F' value derived as per the analysis of variance test are also shown. The last column indicates the significance level.

$H_0$1. The employability skills of engineering students do not differ significantly with respect to their socio-economic characteristics.

Table 3 Communication skills by socio-economic characteristics of student's family

Skill	Socio-economic characteristics of student's family								F	Sig.
	Religious Minorities N: 167		Socio-economically. weak N: 89		Socio-economically very weak N:11		Socio-economically not weak, non-minority N: 352			
	Mean Score	SD	Mean Score	SD	Mean Score	SD	Mean Score	SD		
Communication Skill	29.99	5.15	28.71	5.26	28.00	8.04	30.34	5.20	2.810	*

* Significant at 0.05 level

As could be observed from Table 3, the mean score of students from the 'socio-economic not weak, non-minority (column number 8) category, is the highest of the four groups. Those who are socio-economically very weak, have the lowest score, as per their self-assessment of their communication abilities. The F value is significant at 0.05 levels.

Inference: $H_0$1 is rejected. Engineering students' communication skills differ significantly with respect to their socio-economic characteristics.

2.2. Communication Skills by Parental Education

The educational levels of sample students' parents have been categorized as: a) Post graduates, b) Graduates, c) Poly-Technical, d) Higher Secondary, and e) High School and below. The results obtained by means of ANOVA are presented in Tables 4.1 and 4.2 based on mothers' and fathers' educational levels respectively.

2.2.1. Communication Skills analyzed with respect to student's mother's educational level:

Table 4.1 Communication skills by mother's educational level

Skill	Mother's Educational Level										F	Sig.
	Post Graduate N: 102		Graduate N:242		Poly-Technical N: 11		Higher Secondary N: 77		≤ High School N: 187			
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Communication Skill	31.44	5.07	30.37	5.45	31.09	3.65	28.95	5.11	29.00	5.09	4.854	**

** Significant at 0.01 level

From Table 4.1, it could be noticed that students, with better educated mothers, have significantly higher communication skills than those with less educated mothers. The lowest mean score has been reported by students whose mothers have studied only up to the high school (up to or below standard X) level. Students, whose mothers had received post graduate level of education, have the highest among the five categories. The variations in the skill levels are significant at 0.01 levels.

$H_0$2. The employability skills of engineering students do not differ significantly with respect to their mothers' educational levels.

Inference: $H_0$2 is rejected. The communication skills of engineering students do vary with respect to their mother's educational level.

2.2.3. Communication Skills by Father's Educational Level:

$H_0$3 The communication skills of engineering students do not differ significantly with respect to their fathers' educational levels

Table 4.2 Communication skills by father's educational level

Skill	Father's Educational level										F	Sig
	Post Graduate N: 119		Graduate N: 185		Poly-Technical N: 31		Higher Secondary N:51		≤ High school N: 233			
	M	SD	M	SD	M	SD	M	SD	M	SD		
Communication Skill	31.70	5.50	30.46	5.02	30.61	4.65	29.9	5.49	28.63	5.10	7.772	**

** Significant at 0.01 level

Similar to the findings seen from mothers' educational levels, students' communication skill variations could be observed from their fathers' educational levels also. Students, whose fathers had higher educational levels, had better communication skills. Those with post graduate qualified fathers, had significantly higher communication skills than those who had their fathers who had studied only up to the secondary level.

Inference: $H_0$3 is rejected. Students with better educated fathers have higher scores for communication skills.

$H_0$4. The communication skills of engineering students do not differ significantly with respect to their parental educational levels

Inference on communication Skills and Parental Education

From the results of Table 4.1 and 4.2, it is concluded that higher levels of parental education enhance students' communication skill. Hence, H04 is rejected.

3. Communication Skills analyzed with respect to students' academic excellence at the engineering examination.

In order to analyze this aspect, students were classified into two groups; those with Grade Point Average (GPA) at their University examinations, corresponding to 65 per cent and above were grouped in one category and those with GPA corresponding to below 65 per cent formed the second category. Results only up to their sixth semester were available at the time of data collection, and hence the GPA represents only up to the sixth semester. Many employers keep the cut-off marks for campus selection of entry level engineers at 65 per cent and hence this categorization.

$H_0$5. The communication skills of engineering students do not differ significantly with respect to their academic excellence in the engineering examination.

Table 5 Communication skills by academic excellence: GPA, engineering

Skills/Attributes	Average grade- Engg. Exam.				t	df	Sig.
	≥65% , N: 370		< 65%, N: 249				
	Mean	S.D.	Mean	S.D.			
Communication Skill	30.22	5.22	29.60	5.35	1.441	617	NS

NS–Not Significant;

Communication skill scores when analyzed against students' academic excellence, reveals that their ability in communicating has nothing to do with their academic scores. Those with higher GPA and hose with lower GPA have more or less equal communication abilities, as is evident from Table 5.

Inference: $H_0$5 is accepted. There are no significant differences in engineering students' communication skill scores, with respect to their academic excellence in their engineering semester examinations.

VI. Discussion and Conclusion

The results presented above portray the communication skill levels of a representative sample of final year engineering students in the State of Kerala, India. The major findings from this study and a few other relevant results substantiating this research are discussed herein.

The communication skill levels of engineering students are from 'moderate' to 'good' level. Blom and Saeki (2011), through employer surveys, also had a similar observation. They had stated that engineering graduates have strong English Communication skills. A lot of regional variations have been documented by different authors on this aspect. Shukla (2012) noticed only moderate skill levels among engineering students from Bhopal, the central region of India. Bhagavath and Krishna (2013) have reported 'moderate' to 'below moderate' level competence among the students from Delhi-NCR areas, belonging to the northern part of the country. In contrast, Sita and Rekha (2014) are of opinion that students from technical institutes in the NCR areas are ahead in communication skills, compared to non-NCR areas. (NCR: National Capital Region- A coordinated planning region centered upon the National Capital Territory of Delhi. Prominent cities are Delhi, Ghaziabad, Faridabad, Gurgaon, Noida and Muzaffarnagar). Recently, the Aspiring Minds (2016) in their National Employability Report, for instance, have reported wide variations in the employability skills across India. English Communication was one of the main objective parameters in their study. They found students from Kerala State among the top 25 percentile of employability along with Orissa, Delhi, Bihar & Jharkand. On the other hand, states of Gujarat, Himachal Pradesh, Maharashtra, Rajasthan and Tamil Nadu were at the bottom 25 percentile of employability. According to that report, only around 22 per cent of engineers have the adequate competence in English. The Times of India (2017) has reported that in towns such as Tiruvannamalai and Trichy, in the State of Tamil Nadu, the southern region of India, the communication skill levels of engineering students, especially their oral communication abilities, are very pathetic.

Another important observation from the present study is regarding the inadequacies felt by the student engineers in giving presentations in class, speaking to an audience and such other spoken skills in English. These findings are similar to those inferred by P'Rayan and Shetty (2008).

Students from socio-economically weak families have significantly lower levels of communication skills. This is in agreement with Blasco (2002), Omar et al. (2006) and Jariene & Razmantiene (2006).

Parental education makes a difference in students' communication levels. This is true of mother's educational level as well as father's educational level. Gordon (2013) has reported similar findings.

The communication skills of students with higher and lower academic achievement at the engineering semester examinations are at equal levels. Our findings are in conformity with the observations of Gokuldas (2009), P'Rayan (2011) and Omar et al. (2012).

The study results highlight the need to accentuate the communication skills of students in general, and engineering students, in particular. The essentiality of communication skills in the present and future labour market is being discussed at length, across the world. Students with moderate levels of communication skills will end up with mediocre, under- paid jobs only. In order to enter and climb up the

career ladder and to sustain achievements, excellence in skills, especially communication skills, are needed. This is of paramount importance for global competence.

The lower scores in communication skills of students from socio-economically weak families need special attention from policy makers and academicians. Unlike analytical skills and mathematical abilities, fortunately, this is a skill which could be taught and cultivated. Besides special classes on communication skills, making opportunities and encouragements for class presentations, to meet and talk with small audience, and to express their ideas in clear and simple ways are required throughout the engineering study. It would be much better if such experiences could be given from school classes onwards. These rich experiences, could, to a large extent, iron out the skill variations on account of lower parental education and weaker socio-economic background. As the communication skills of students with higher and lower academic achievements are the same, it would be of greater benefit, if they could attain higher proficiency in their communication skills too.

Finally, it may be noted that a detailed study on various aspects of communication skills of students at graduate level, taking into consideration regional disparities may be of great value to the nation as a whole.

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