



Engineering Communication Skills for Novice Engineers: A Pilot Project

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Abstract: Industry has broadened the job scope for engineers. Engineers have to perform multiple projects in terms of technical and non-technical. Technical skills require integration of communication skills in modern industry. This research attempted to discover communication skills significance for novice engineers. Also, it explored communication skill training needed for novice engineers. A purposive sampling research design was employed to draw the results. Twenty (20) final year engineering students participated in this qualitative study. The study research instrument was focus group interviews. Findings described that communication skills play a significant role for engineers in the work environment of modern industry. Moreover, inadequate communication skills training are provided to engineering students during study time. Pakistan Engineering Council (PEC) should emphasize upon engineering universities of Pakistan to train engineering students in hard and soft skills.

Key Words: Engineering, Communication Skills, Novice Engineers, Modern Industry

Introduction

This research rationale was to investigate communication skills significance for novice engineers. Additionally, it was focused of this study whether communication skills trainings are provided to novice engineers during study time. The targeted population was a final year engineering students. 21st-century engineer should possess a different skill set compared to olden times. [Caten et al., \(2019\)](#) stated that for future Engineers importance of technical skills is bigger than that. Soft skills are an imperative accompaniment to hard skills for engineers that contribute towards employability ([Winberg et al., 2020](#)). Hard and soft skills go together rather than individual entities ([Robles, 2012](#)). Current and future engineers should possess strong communication skills to communicate

with workers, customers, colleagues, and managers. Additionally, they should possess the capacity to solve industry technical problems—engineers who fall short in this skill set lack behind in better job opportunities and job promotions. Novice engineers should be trained with hard and soft skills. Engineering graduates armed with hard and soft skills avail job opportunities ([Succi & Canovi 2020](#)). Employers want engineers with communication, presentation, team building, persuasion, and problem-solving skill. Powerful communication skills support exchanging views with multiple stakeholders that benefit organizations because they earn profits. During the COVID-19 pandemic, companies conducted online business. Engineers with strong communication, convincing, and persuasion

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skill increased business productivity. Engineering curricula taught engineering students of Pakistan does not meet the communicative needs of students. Single-subject of English and communication skills is taught to engineering students in most of the universities of Pakistan. Hence, engineering students fall short of ineffective communication skills.

Literature Review

Communication has been documented an essential skill necessary in the engineering profession. Communication enjoys extensive role in engineering ([Bjekic et al., 2015](#)) due to its increasing influence in the global market. Engineering communication employs many communication modes such as oral, written, and visual ([Dalinova & Pudlowski, 2009](#)). Engineers armed with effective communication skills enjoy a significant advantage over other engineers who lack this skill. They succeed in promoting industry products in the national and international market due to this skill. Communication skills shall occupy an upper position in an industrial environment in the near-term days ([Wren, 2018](#)). Engineering communication involves forms of networking with customers, consumers, suppliers, dealers, and team workers ([Hynes & Swenson, 2013](#)). The most named soft skills are communication, teamwork, leadership, and problem-solving skills ([Teng et al. 2019](#); [Winberg et al., 2020](#)). Engineering students should partake in communication events to grow effective communication skills. It falls under the mandate of engineering universities to promote students' communication skills during study time. Employers show reluctance to arrange communication or soft skill trainings for novice engineers. Employers opine that engineering universities should fulfill their academic responsibility and provide competent engineering graduates. Employers convey concerns that novice engineers possess poor communication skills. Therefore, they are never ready for industry jobs. It indicates a mismatch or lack of communication between engineering institutions and industry ([König](#)

[and Ribarić, 2019](#)). [Norback et al., \(2010\)](#) established this idea that communication skill courses taught in engineering universities are never in line with industry need. Multiple factors fence communication skills of engineering students ([Hanson et al., 2017](#)). Hence, academicians should propose a resolution of the communication barriers of students. The gap in engineering education entails special attention since industrialists look for communicative competences for the engineering workplace ([Ting et al., 2017](#)). Engineering universities of Pakistan focus on the technical skills of novice engineers, and technical skills all alone are never sufficient for competitive jobs ([Lazarus, 2013](#)) of organizations. In this scenario of the globally competitive work environment of engineering organizations, the need for communication skills has vital importance ([Seetha, 2014](#)). Broadly speaking, communication skills fall under the umbrella of soft skills. Underneath workplace communication terminology, soft skills comprise communication, teamwork, motivation, problem-solving, and trust ([Ellis, Kisling, & Hackworth, 2014](#); [Rasul, Rauf, & Mansor, 2013](#)). Valued employees enjoy the combination of hard and soft skill competencies ([Griffith & Hoppner, 2013](#)). Personnel working in management positions spend a good percentage of their time communicating ([Pattillo, 2013](#)) with the public. Organizational success is co-related with effective communication ([Waldeck et al., 2012](#)) skills of engineers. Engineers' effective communication skills increase the chances of job opportunities in English and non-English speaking countries ([Chavez et al., 2017](#)).

Engineering organizations conduct business at national and international fronts. Thus, it requires the effective communication skills of engineers to earn profits. Engineering universities should work to elevate students' communication skills ([Donnell et al., 2011](#)). Engineers' professional life is reliant on the acquisition of effective communication skills in this modern age of corporate economies. A misunderstanding prevails among engineering students that communication skill is needed for engineers who occupy management positions

(Trevelyan, 2014) in industry. The truth is engineers have to work on multiple positions in job tenure. Employers complain about the deficient communication skills of novice engineers. Just making grumbles does not serve the purpose, but employers should discover reasons of communication skill deficiencies of engineering graduates. Engineers exposed to communication skill trainings demonstrate confidence in communication task performance (Trevelyan, 2014). Gunn (2013) explored communication skill deficiencies of engineering students. The researcher found poor oral communication skill as the main communication skill deficiency of engineering students. Soto-Cabanare et al., (2011) studied engineering students' communication skills challenges. This research concluded that poor rehearsal, presentations, and handouts reading were communication challenges for engineering students. Wisniewski (2018) summarized effective engineering communication characteristics. Data were gathered from managers and said that ability to work with diverse audiences, use of communication strategies, and delivering information confidently were engineering communication characteristics.

Study Objectives

- i. To identify the significance of communication skills for novice engineers to perform industry jobs efficiently.
- ii. To identify whether communication skills trainings have been provided to novice engineers by engineering universities

Research Questions

- i. What is the significance of communication skills for novice engineers to perform industry jobs efficiently?
- ii. Have communication skills training been provided to novice engineers by engineering universities?

Study Methodology

Engineering education research is driven by research questions (Borrego et al., 2009). Qualitative methods have been implemented for engineering education (Walther et al., 2017). Qualitative research is a fit approach to understanding human problems. Such an approach is branded with data collection through emerging questions and the researcher's data interpretation (Creswell, 2014). Examining these merits, a qualitative research approach was executed for this study. A purposive sampling research design was chosen. Final-year engineering students were respondents—Focus Group interview as data collection instrument. Twenty (20) engineering students enrolled in Bachelor of Engineering (B.E) programs participated in this survey. Data were analyzed through a content analysis approach to draw study outcomes as per research questions set for this study.

Study Finding

Part I- Significance of Communication Skills for Novice Engineers

- *“Communication skills hold great importance, as an engineering student, technical ideas must flow into our minds and to convey or share those we must have good communication skills”. [STD 5].*
- *"Communication skills play a good role in any field in life. We must learn skills for making own personality and become a good engineer". [STD 6].*
- *"Yeah, definitely in the workplace we have to communicate with everyone; cooperation is essential in that kind of environment". [STD 7].*
- *“Its importance cannot be denied, because we need the tool of communication to interact with the persons in the workplace”. [STD 10].*
- *“Yes, inface communication in any field plays a vital role. If you cannot communicate properly, it will be considered that you don't know anything". [STD 12].*

- “Yes, the communication skills always play an important role in any place and in part of life. Because skill power is the main source to convenience”. [STD 13].
- "Yes, it has importance in the workplace because if we don't have the skills how we would communicate with others then how we would complete our goals". [STD 14].
- “It is very important in the field or workplace, the better to communicate with boss or subordinates, the better performance will be seen”. [STD 15].
- "Yes, we know essentially of communication skills in any kind of workplace or any kind of field because without communication we cannot overcome our problem". [STD 16].
- “Yes, but still not reached at that level. Because no facility to learn English in university. Just one term study can't do that”. [STD 17].
- “I know the importance because there are thousands of engineers graduate so only this skill, we differentiate ourselves from others”. [STD 18].
- “Yes, I know because I had also remained an apprentice trainee at OMV (Pakistan) and there I came to know about the importance of communication skills.” [STD 19].
- “Yes, it is very important because if we don't know how to communicate with people, we never become a good engineer”. [STD 20].
- "Yes, all you need in the workplace is your communication skills. You can satisfy your boss and colleagues. Yes, in the field, communication skills are very essential and play a vital role. It plays a vital role in the improvement of one's personality and it motivates one to change behavior with others. Yes, communication is a basic thing for talking anywhere...yes indeed, because if we have knowledge but don't have abilities to express ourselves then it is a big drawback. In this subject we learn many practical life aspects how to talk... [STD 1,2,3,4,8,11].

Part II- Communication Skills Trainings Provided to Novice Engineers

- “No, I did not join any communication skills training program”. [STD 2].
- “No, I did not attend any communication skill training program, because until yet I didn't get any chance”. [STD 6].
- “No, I had no any skills training program”. [STD 7].
- “No, I do not have the regular training but in some seminar in which the communication improvement technique watched”. [STD 9].
- “No, I do not have any communication skills training program yet”. [STD 10].
- “Sometimes I am trying communication by itself”. [STD 11].
- “At that time, I was too lazy in my Engineering Course, so I had no time for English course”. [STD 12].
- “No except my subject i.e., communication skill”. [STD 14].
- “I had only studied the communication skills subject not more than that”. [STD 15].
- “No sir, I haven't yet, because neither I tried ever nor my institute provided me the opportunities to do so”. [STD 16].
- “No, I have only learned the communication skill, no any training program”. [STD 17].
- “There is no any institute unfortunately so we are back day by day so organize these institute please”. [STD 18].
- “Unfortunately, still no any communication skills program I had attended”. [STD 19].
- “No, I never heard any training program as communication”. [STD 20].
- “Yes, I had joined some communication skills classes”. [STD 1, 3,4,5,8,13].

Discussion

Novice engineers stated that communication skills play a paramount role in engineering profession. Because, effective communication skills assist in conveying ideas with many people such as workers, shift in charges, fellow engineers, managers, and industry executives.

Moreover, communication skills play sound in personality development generating an impression of an efficient engineer in the field. Communication motivates them to develop an environment of cooperation and coordination. It is an effective tool to interact with multiple stakeholders at workplace. Novice engineers exhibited an apprehension that if they fail to communicate properly, it shall develop an impression that they are poorly trained for industry job and they possess poor knowledge about their field. They held an opinion that communication skills are extremely important in any field specially in the engineering profession. Communication skill has the power to convince multiple people, for example, customers, colleagues, workers, supervisors, managers, and other employees of organizations to develop an effective industrial liaison and exchange of manpower to promote industry business. Novice engineers further opined that if they don't have effective communication skills, then it would be problematic for them to achieve organizational goals. It further emerged from the data the better communication skills, the better work performance on the part of engineering graduates. Communication solves many problems thus; and engineering students communication problems should be timely addressed to be productive engineers for organizations. Engineering students complained that engineering universities do not provide any facility to learn English at university and only one semester of English or communication skills is never sufficient to hone academic and professional communication skills. Novice engineers expressed the idea that there are thousands of graduating engineers and only effective communication skills will give edge upon fellow engineering graduates. Engineering students further added that if they are unable to communicate well with people, then they shall never be considered as a good engineer.

For research question 2, majority of novice engineers indicated that they have never availed communication skill training. However, few novice engineers informed that although they have no regular communication skill

training, in some seminars, they came across how to improve communication skills. Engineering students admitted that in engineering communication skills course, they were lazy and they devoted less time learning English course. An interesting finding emerged in this research question that neither engineering students tried to acquire effective communication skills nor engineering universities provided chances for communication skills. They criticized that, unfortunately, they do not see any institute that can help them to upgrade communication skills since they are not proficient in this skill yet. They desired for establishing an institute for developing communication skills to perform workplace jobs as per employer satisfaction. An engineering student uttered that he has never heard communication skill training program. However, engineering students responded that they have attended communication skill course at university only.

Conclusion

Novice engineers admitted that communication skills play a paramount role in engineering profession. It is the tool through which they can convey ideas with workers, fellow engineers, managers, and industry executives. Novice engineers were apprehensive that poor combination skill shall develop an impression at the world of work that they don't know anything. Novice engineers confirmed that communication skill has power to convenience multiple stakeholders to develop strong industrial liaison for exchanging information and manpower that ultimately will increase industry productivity. Novice engineers opined that the absence of effective communication skills will create problems to achieve industry objectives. It surfaced that engineering universities do not provide any platform to engineering students for developing academic and professional communication skills. Moreover, only one semester teaching English or communication skills is never sufficient. Thus, engineering universities should add more communication skill courses in engineering curriculum to meet engineering students need.

In fact, effective communication skills give superiority upon other engineers at the workplace. An impression has emerged in engineering organizations that poor communication skills means poor engineers. As far as, communication skills trainings are concerned, novice engineers said that they never availed communication skill trainings at universities. This finding also emerged that neither engineering students tried to acquire effective communication skills nor engineering universities provided communication skills opportunities to them. It indicates that acquisition of technical skills is the topmost

priority of engineering universities of Pakistan. It raises the need to develop effective communication skills of engineering students. This responsibility should be put on engineering universities shoulders to fulfill this task. It also emerged that engineering students were unaware about engineering communication skill trainings. Hence, Pakistan Engineering Council (PEC) should pressurize engineering universities to focus communication skills of engineering students to prepare trained engineers for industry in terms of hard and soft skills.

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