

Impact of Soft Skills Training on Engineering Students' Performance

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Received: 23.11.2025 Revised: 6.12.2025 Accepted: 15.12.2025

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Abstract: Soft skills, such as communication, teamwork, time management, emotional intelligence, adaptability, and problem-solving, are essential, and in the case of academic performance of the engineering students, complement learning. The study focuses on performance and soft skills training of engineering students. The analysis of soft skills on learning behaviors, participation in the classroom, confidence, performance in assessments, and academic achievement overall draws from the academic literature, levels of education, and teaching and learning strategies. The analysis indicates that the students show better performance, improved performance and understanding of the technical subjects, and better engagement in teamwork, which resulted in the students enhancing their self-efficacy. The Integration of soft skills training in engineering education is not just desirable, but essential for student development in all its aspects. The study concludes with the need for academic curriculum development and the incorporation of soft skills within the academic core for the purpose of improving soft skills learning outcomes in order to meet the imperative of the students for achievement on the academic and professional levels.

Keywords: Academic performance, communication skills, emotional intelligence, engineering education, holistic learning, and soft skills training.

1. INTRODUCTION

Traditionally, engineering education, in learning activities, focused on techniques including remembering, understanding, applying, analyzing, synthesizing, and evaluating processes to develop knowledge in the selected engineering discipline, along with the required mathematics and other basic sciences. While these learning outcomes continue to be important, the educational literature and employers' comments in the field signal an educational gap that is becoming increasingly evident in learning outcomes, as evidenced by the gap in knowledge in engineering, as well as its application to authentic problems in the discipline. Supporting the gap is the lack of what are called soft skills. These are the abilities that are in existence that are not of a technical nature and can include an individual's skills in communication, working with others, leadership, flexibility, prioritisation, time management, emotional intelligence, and working with others. Interpersonal skills can be the tools used in the selection of one or more of these non-technical abilities and can be and are used interchangeably with the term 'soft skills'.

In a learning environment, soft skills are the tools that can be used that can influence the ways that an individual engages with the content of the learning, and with other learners and the instructor of the learning. In achieving

academic tasks, soft skills can determine in what ways and to what extent a student can manage their learning and assessments, such as examinations, presentations, and project tasks, and the subsequent activities that are within a project. In engineering education, students are required to complete and perform in a variety of courses in a limited time period. Hence, students are required to have highly demanding, difficult, and highly prescriptive courses of study with high expectations. These courses require high levels of cognitive skills and emotional resilience.

Research shows that students who have soft skills such as organization, confidence, communication, and flexibility are the ones who do the best in school. This is because students with soft skills are better able to understand and express ideas. Having soft skills makes managing time better for students, which is a good way to work on study habits and lessen stress. Students with soft skills are more likely to have the inner strength to work on and fight to achieve their educational goals. In engineering education, students are expected to have good collaboration skills to be successful in project-based learning environments.

This paper looks at the academic performance of engineering students and soft skills training to close the gap that is in the school. This will show that students' soft skills are not on the outskirts of schoolwork, but are in the center,

and will prove that these skills are essential for students to be successful. This will show that soft skills are closely related to a student's performance in school.

Across every discipline in higher education, the role of soft skills in education has been recognized. The impact of soft skills on education has been recognized. The educational researchers state that learning cannot be understood at the cognitive level, but it also involves the behavioral and emotional aspects of students. There are several educational psychology theories out there that prove that students' attitudes toward the content, their ability to communicate, their socio-emotional skills, and the way they interact with their peers have a great impact on learning outcomes.

In the field of engineering education, communication skills are deemed the most important academic soft skill. In running the various engineering courses, the students need to verbally communicate their ideas and to be able to articulate these ideas both in writing and verbally in the different assessments, such as laboratory and project reviews, seminars, and written tests. Research shows that students who communicate better are more conceptualized and can perform effectively in both oral and written assessments.

Time budgeting is one of the most important skills that must be gained for academic success. Research shows that students who are trained in the skills of effectively managing their time (time budgeting skills) are more disciplined academically, procrastinate less, and score better on their tests. Proper time budgeting (planning) enables a student to distribute the time needed for coursework, laboratory work, and self-study more effectively.

Academic research is increasingly focusing on emotional intelligence. This is the ability of a person to manage their stress, to be motivated, and to have resilience. Students in engineering, due to the nature of the field and course, are highly susceptible to stress academically. Research shows that students who have a high degree of academic emotional intelligence perform better and have a steady academic performance.

Engineering education is increasingly adopting project-based and experiential learning methods. In this regard, teamwork and collaboration skills are highly valued. Research shows that students who have strong interpersonal skills perform better in group work and are more active participants in the learning environment. Multiple sources indicate that soft skills improve both job and academic outcomes. Still, there's not enough integration of these skills into formal engineering courses. This paper takes existing research and attempts to analyze the role structured soft skills training plays in engineering students' academic outcomes.

2. OBJECTIVES OF THE STUDY

The present study is guided by the following objectives:

- Investigating how soft skills training impacts the academic outcomes of engineering students.

- To determine which specific soft skills significantly relate to academic achievement.
- To investigate the association between communication skills and academic self-efficacy.
- To analyze how soft skills affect students' study habits, engagement in class, and how they learn.
- To illustrate the necessity of assimilating soft skills into the teaching of engineering.

3. METHODOLOGY

Research Design: This study employs a conceptual and qualitative research design. It involves theoretical analysis, the interpretation of academic literature that is currently available, and the integration of educational methods that relate to soft skills training in engineering education.

Sources of Data: The Data for this study were drawn from:

- Scholar articles on soft skills and higher education.
- Research on the pedagogy of engineering.
- Documents on the reform of the curriculum of technical education.
- Documented observations and student feedback of educators within the literature.
- Research on the psychology of the learning system and emotional intelligence.

Nature of the Study: The study does not involve any sort of experiment or analysis from a statistical point of view. It rather seeks to find correlations and patterns and the relationship between soft-skill training and academic-performance from the level of theory and evidence. Such a theory is critical in trying to understand behavior and educational realities. These are educational phenomena within the context of education.

4. DISCUSSION

Role of Communication Skills in the Academic Performance of the Student: The communication skills necessary to facilitate academic performance are critical to engineering education. It is essential for the students to understand the complex ideas and thoughts in each subject and to be able to communicate the problems as well as provide a viable solution to the subject matter at hand. It is in this communication that one's academic performance is reflected, since effective communication is needed to facilitate reading, writing, and oral skills.

Communication and Academic Performance: Students who are able to communicate effectively can take part in classroom discussions and are free to request clarifications and engage the professors at any level. Such students can perform high standards during oral presentations and assessments, which are in the form of presentations in seminars, project labs, and classroom laboratory exercises. Such communication is also essential in guiding students to prepare and write technical documents in the form of laboratory records, reports, and answers to examinations. That means confidence, comprehension, and clarity of

expression are affected by communication skills, and, therefore, these skills directly impact academic performance.

Working with others and collaborative learning: Group learning and collaborative education, like design exercises, laboratory work, and group schema, have become a staple of engineering education. Since these students can cooperate, resolve conflicts, and take roles, they can demonstrate teamwork. Participating students can add group work and have their project assessment improved, and students exemplifying these characteristics have taught adaptability and gained leadership skills. Moreover, collaborative learning broadens peer education and provides an opportunity for students to grasp concepts at a fundamental level through problem sharing and collaborative discussion. Improved academic involvement and satisfaction, and learning through highly effective teamwork, are benefits of enhanced project and collaborative work.

Discipline and Time Management: Management of time litters soft skill and has a pivotal impact on academic performance. Engineering students often have difficulties managing their time with multiple subjects, projects, labs, and exams. Time management soft skills training helps students plan their study schedules to prevent stress at the last minute. Students with good time-management skills have better study routines, and assignment deadlines are met. Continuous assessment and semester exams are passed with better performance due to better preparation. Reduced academic anxiety and burnout lead to consistent performance and time management.

Emotional Intelligence and Stress Management: Students need emotional intelligence to learn to understand and control their feelings and understand the feelings of others. Emotional intelligence is one of the most important human skills that students need most while learning Engineering, because the study of Engineering is tough and stressful. Students with high emotional intelligence can cope with the stress of exams, schoolwork, and relationships. Students with high emotional intelligence will be able to cope with stress and motivate themselves to continue working towards their goals even if they face challenges. Emotional intelligence helps students create positive relationships with other students and teachers. Emotional intelligence helps form positive peer relationships, which makes students feel safe to learn. This stability helps students with their studies and helps them learn new skills.

Problem Solving and Critical Thinking Skills: Problem-solving and Critical Thinking are other important requirements in the study of Engineering. The study of engineering also requires the learning of soft skills, which include the study of decision-making and the use of creativity and analysis. Students who learn one or more methods of problem-solving are more able to use their knowledge to create new and innovative ideas in their work that help them solve new and complex engineering design problems. The knowledge of problem-solving is useful in the study of design, programming, and engineering courses. Students' knowledge of problem-solving can be measured by their marks and their ability to understand course content.

Overall Impact of Soft Skills Training on Academic Performance. Training engineering educators in soft skills has a broad academic impact, as students show:

- Higher grades.
- More active engagement in class.
- Better presentation and examination performance.
- Increased understanding of challenging subjects.
- Enhanced performance in field projects and practical.

Soft skills development means students learn to use the technical skills they have. Different student academics are successful in a continuous and well-rounded way.

Implications for Engineering Education: Attention to soft skills training in engineering is a call to design new engineering educational curricula more flexibly. Engineering educational institutions must be encouraged to prioritize the integration of soft skills training as a core and non-optional educational module. These shifts should be reflected in faculty development programs that underscore the importance of soft skills in teaching. Suggested assessment shifts include paper and practical that emphasize soft skills and technical skills in activities such as presentations, group work, and reflective writing to provide a more rounded student educational experience. These shifts and educational changes support a more holistic and balanced development of students.

5. CONCLUSION

Academic performance among engineering students is affected greatly by how soft skills are taught. How students communicate and their individual skills regarding teamwork, time management, emotional intelligence, and problem solving each impact learning behavior, confidence, and academic performance individually. There is a higher level of academic performance exhibited by students who are given soft skills training in a structured format. They tend to be more organized* and involved. An inclusive perspective is required from engineering education in order to focus on the soft skills as well. This is also the case for incorporating soft skills training into engineering programs as a means to achieve academic performance, prepare them for the workforce, and provide them with the skills necessary to succeed in life.

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