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Nurturing future Engineers through Industry-Oriented Training: The imperative of Core Competencies

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***Abstract*—This research paper investigates the transformative effects of Industry-Oriented Training (IOT) at St Joseph Engineering College both on engineering and management graduates. The IOT course under evaluation emphasizes five essential skill sets: communication, self-evaluation, leadership, team building, and problem-solving. The study analyzes the impact of this comprehensive training endeavor on students' academic performance, employment, and career paths. The findings demonstrate the tangible benefits of the well-planned and structured IOT curriculum. The program's participants graduate with the critical problem-solving abilities essential for success in challenging work environments. The investigation extends beyond traditional academic metrics to demonstrate the substantial impact of IOT on professional and personal development. This study emphasizes the critical significance of effective communication, the potency of self-evaluation in fostering adaptability, the transformative potential of leadership skills, the value of teamwork in achieving common goals, and the critical significance of problem-solving prowess in addressing contemporary challenges. This study indicates how industry-oriented training acts as a catalyst for holistic growth, enabling students to not only meet but also exceed the expectations of the engineering and management landscape's constantly evolving expectations. For educators, organizations, and corporations committed to fostering the next generation of dynamic and competent professionals, the paper offers insights that will be invaluable.**

***Keywords*—Communication, Industry Oriented Training, Leadership, Problem-Solving Skills, Self-Evaluation, Teamwork.**

***JEET Category*—Research**

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I. INTRODUCTION

ENGINEERING has grown into an integral field that influences how people live, work, and interact with the world around them in a constantly changing global environment marked by rapid technological breakthroughs. Engineers, the pioneers of innovation, are leading the way in transformation. Though technical prowess continues to be the cornerstone of engineering education, the needs of the current world demand a wider range of competences to go along with their technical acumen. Engineering has expanded beyond its traditional limitations, which were characterized by equations, formulas, and technical designs. Today engineers are expected to not only develop and build creative solutions, but also to communicate effectively, critically evaluate their own performance, show leadership ability, encourage collaborative teamwork, and skillfully maneuver through the complex maze of problem-solving. These qualities have evolved into the fundamental skill sets that set outstanding engineers apart from their peers and enable them to succeed in a dynamic and increasingly interconnected environment.

Recognizing this imperative, St. Joseph Engineering College in Mangalore launched the Industry Oriented Training Program, an activity-based course aimed at fostering these crucial skill sets. In order to ensure that students are equipped for accomplishment both in their technical jobs and a broader spectrum of engineering challenges, this course aims to guide individuals to acquire these quintessential skills. The course

spans for ten weeks of two-hour sessions each and is delivered by specially trained facilitators for students in the first year of undergraduate and post graduate studies. The primary objective of this program is to equip students with the skills necessary for success in a contemporary engineering environment: effective communication, leadership, self-evaluation, teamwork, and problem-solving.

It is crucial to be able to communicate challenging technological concepts clearly and precisely in an age characterized by international projects and multidisciplinary collaboration (Riemer, M. J., 2002). To advance projects, engineers must interact with a wide range of stakeholders, including other professionals in engineering and non-technical decision-makers (Khamidjanovna et al., 2022). Effective communication abilities fill the gap between exceptional concepts and their realization, ensuring that innovations are brought to life for the benefit of society. Communication includes the capacity to effectively communicate technical information through reports that are written, demonstrations, presentations, or visual aids. Collaboration with a variety of stakeholders, such as clients, coworkers, and policymakers, is facilitated by this competence. Interdisciplinary teams are prevalent in many engineering projects today. Graduates with effective communication skills can bridge the gap between experts in various domains, preventing ideas from being lost in translation. Project specifications, finances, and deadlines are frequently subject to negotiation by engineers. Their ability to advocate for their ideas and reach amicable settlements depends on their ability to communicate persuasively.

The ability to reflect on and evaluate is pivotal (Singh & Diefes-Dux, 2023). It is important to recognize opportunities for improvement, adapt to changing circumstances, and maintain agility. Engineers who regularly reflect on their work analyze their prior endeavors and experiences. In a bid to foster a culture of learning and adaptability, they deliberate on what went well and what might have been done differently. It's vital to be flexible to evolve with trends whilst remaining abreast of emerging technologies. In a field that evolves constantly, self-evaluation aids engineers in remaining agile and ahead.

Along with communication skills, engineers are recognized for their leadership traits. Leadership remains vital for engineering projects that may involve developing innovative technologies, creating sustainable infrastructure, or addressing global issues (Daley & Baruah, 2021). The capacity to motivate, lead, and draw teams together in pursuit of shared goals is an essential trait. Engineers who embark on managerial roles influence not only the course of their projects but also creativity and adaptation on a larger scale. Engineering graduates with excellent managerial skills can inspire coworkers, lead teams, and steer projects toward success. They inspire the team to work collectively towards a shared goal. Even under extreme circumstances, leaders make prudent choices. The optimal course of action for a project is determined after assessing the risks and rewards and consulting experts. Conflicts and disagreements can arise during engineering projects. Constructive conflict resolution is an attribute of strong leaders, who preserve positive and effective team dynamics.

Engineering necessitates collaboration at each phase, so fostering teamwork skills is fundamental to establishing cohesive and effective teams. To attain the best results, engineering graduates must learn ways to utilize all of the team members' strengths. Effective team builders value diversity because they understand that diverse viewpoints and experiences improve problem-solving techniques (Ginting et al., 2020). They cultivate hospitable atmospheres where everyone on the team is given attention. For it to guarantee that each team member contributes their expertise in an effective way, team builders explicitly define the roles and responsibilities in a team. Complementary to leadership, team builders are adept at resolving conflicts within the team and promoting a positive work environment.

To address complex challenges, engineering graduates need to have excellent problem-solving skills (Bhadargade et al., 2020). Graduates with strong problem-solving abilities not only recognize problems but also engage them with creativity and resiliency, arriving up with innovative solutions that may transform industries and the community (Ergin et al., 2020). Engineers take an analytical approach to challenges, dissecting them into smaller, more manageable parts and discovering the primary issues that need to be resolved (Schefer-Wenzl & Miladinovic, 2019). Engineers look for unique approaches to problems and think beyond the norm to create inventive solutions that result in breakthroughs. Iterative problem-solving is a common practice. Engineers test and improve their designs, learning from errors and adapting their methods as appropriate. The purpose of this article is to delve into the impact of the industry-oriented training program on students' academics, placement prospects, personal development, and career paths.

The significance of thriving by remaining ahead of the trends cannot be overstated, since workplace dynamics and transformations are changing at a faster rate. It is imperative that freshmen possess competencies that are marketable in the corporate sector. It would create a maze of possibilities for them to mould their careers. It would be a game-changer if they could quickly adapt, acquire the necessary skill sets, and transform themselves, becoming employable and future-ready. The Campus to Corporate Program at St Joseph Engineering College in Mangaluru is designed to create future leaders by providing graduates with the appropriate blend of knowledge, skill, and attitude.

In addition to improving their technical abilities, students in the CTC Program acquire problem-solving techniques, business etiquette, career guidance, aptitude assessment, and company-specific training that will help them create successful careers. The first and second year students of the autonomous batch are enrolled in audited courses on problem-solving skills and business etiquette as part of the Campus to Corporate Program, which is known as Industry Oriented Training. The goal of the segmented IOT program is to equip graduates with the cutting-edge capabilities necessary to close the gap between industry and academia. The program's effectiveness, which is examined in this article, is centered on the essential skill sets that students need to succeed in the industry: Intra- and interpersonal,

leadership, problem-solving, and quantitative aptitude are the communication skills.

The study aims to discuss the effectiveness of the course in preparing engineering graduates for the dynamic challenges of the twenty-first century by diving into the outcomes and insights garnered through the course of this endeavor. Ultimately, the development of these skill sets will enable engineering graduates to not only address today's needs but also contribute to developing tomorrow's solutions, effectively bridging the gap between university and industry.

II. LITERATURE REVIEW

Business communication is critical for career success, and both academia and business acknowledge it. Graduates have to be proficient in their language skills and have excellent interpersonal skills. Digital literacy is also an essential skill set for modern engineers. According to the study (Riemer, 2002), to remain relevant in the global scene of the twenty-first century, engineering graduates have to constantly improve their skill set. Effective communication is perhaps the most crucial of these abilities. Inept interpersonal abilities tarnish the engineer's image, but that can be addressed through the integration of emotional intelligence (EQ) into the engineering curriculum. EQ components improve communication abilities and facilitate experiential learning. However, due to traditional engineering curricula, implementation of these modifications may be slow. Institutions that incorporate multilingual and communicative components into their program will efficiently satisfy business and societal demands, the study says. Language and communication courses are critical for supporting lifelong learning and developing engineering education by improving fundamental communication skills.

Research makes a compelling argument for teaching communication skills to engineering students (Khamidovna, 2022). It emphasizes the vital role that language skills play in aiding the transmission of scientific innovations. This insight is particularly crucial in the current interconnected global landscape when quick access to cutting-edge information and technologies is critical for staying relevant. Khamidovna. (2022) effectively argues that English competence is more than just a language competency for engineers and scientists. It accentuates the significance of integrating communication skill-based courses into engineering courses in order to ensure that students are well-prepared to deal with the most recent innovations in their area.

A study by Santhanasamy & Yunus. (2022) investigates the efficacy of the flipped learning technique in improving students' communication skills. Self-regulated learning, enhanced interaction, higher motivation, and improved academic accomplishment as the key elements of integrated engineering education that stress both technical and soft skill development. According to the authors, it is important for students to take responsibility for their learning experience, stimulate peer cooperation, and encourage idea exchange both within and outside of the classroom. This expands speaking opportunities and promotes active language learning. The research concludes by emphasizing the usefulness of creating a suitable learning environment for improving speaking abilities. It implies adopting these creative methodologies can assist educators, policymakers, and students by sustaining and improving the teaching and learning of speaking abilities across multiple educational levels.

While engineers acquire the expertise they require, self-evaluation is an essential component of professional and personal growth as it enables people to critically assess their performance, recognize their strengths, to determine areas for development. It serves as an effective tool for learning and development, allowing individuals to take control of their own development. Self-evaluation allows graduates to become self-regulated learners, developing independence and a deeper understanding of their talents and learning practices. Furthermore, it contributes to continual skill refinement and adaptation in an ever-changing labor market and reaches higher degrees of excellence in education, careers, and different facets of life in professional settings.

Singh and Diefes-Dux's (2023) study investigates the significance of self-evaluation and the usage of metacognitive methods among engineering students. It underscores the importance of students actively participating in metacognitive characteristics such as planning, monitoring, and evaluating. The study looks into the combination of self-evaluation and self-reflection activities to see how and at what levels students use these metacognitive methods. The data show that students used the Evaluating method more during self-evaluation and the Planning and Monitoring strategy more during reflection activities. However, student participation in these metacognitive methods was mainly low to medium. Hence the IOT sessions at SJEC are designed to be activity-based which makes it engaging and improves participation.

The relevance of this work arises from the need to produce self-regulated learners by allowing students to engage in deeper and broader levels of metacognition through the integration of multiple activities in a course. While the study shows that self-evaluation and subsequent reflection activities enable students to use a variety of metacognitive strategies, it also implies that their engagement levels should be increased to facilitate deeper learning. The study advocates for the creation of instructional practices that will help students become self-regulated learners.

Engineers should be able to lead in a dynamic and collaborative professional environment. Engineers must communicate effectively, lead teams, make ethical decisions, promote innovation, and sustainable solutions, and lead successful project execution in addition to their technical expertise. Engineers need to foster not only technical expertise but also the ability to inspire, guide, and adapt in a constantly shifting engineering sector. The paper by Daley & Baruah (2021) investigates the changing responsibilities of engineers and the importance of understanding the abilities organizations require from them. The study reveals a growing need for leadership development among engineering students. However, academics provide limited guidance in integrating leadership into the engineering curriculum. The research illuminated the integration of leadership education. It identifies a gap between the needed leadership qualities of industry and what

undergraduate courses prioritize. According to the team, to teach leadership it is advantageous to combine team-project-based engineering with business or management features.

The work by Marquez & Garcia (2021) addresses the importance of communication and leadership skills often overlooked in undergraduate engineering curricula. It presents findings from a qualitative study on students' experiences with the Popsicle-bridge project. The results highlight the essential role of leadership and effective communication in project success, emphasizing delegation, frequent meetings, and managing diverse ideas as key components of communication. While individual projects present challenges, communication with peers allows for idea exchange and addressing specific questions, ultimately facilitating collaborative problem-solving. This study underscores the value of integrating communication and leadership skills into engineering education to better prepare students for real-world engineering practice.

Teamwork is an important aspect of engineering education and practice Franken et al. (2022). To address complicated challenges and innovate, engineers often work together in diverse teams. Its role in fostering collaboration, communication, and effective problem-solving skills cannot be undermined. It aids in preparing engineers for the challenges of the modern workplace, and engaging in team-building activities can help engineers acquire the interpersonal and leadership skills needed to thrive in their professions. Gintinget et al., (2020) investigated the impact of Outing Team-Building Training on the development of students' soft skills. It recognizes training to be beneficial for enhancing these skills, with participants demonstrating positive reactions and greater knowledge. The work by Marasi, S. (2019) provides learners in higher education with structured team-building training to bridge knowledge gaps and improve employability. It lays emphasis on interpersonal skills through experiential learning and improvisational exercises. The findings show that the training is successful in enhancing teamwork abilities and instilling favorable attitudes towards teamwork.

Problem-solving is important to engineering practice and innovation. Engineers constantly deal with complex tasks that necessitate innovative solutions and foster critical thinking, analytical, and decision-making abilities. It not only prepares engineers for real-world problems, but it also encourages innovation and efficiency in engineering projects. Structured problem-solving exercises provide engineers with the tools they need to solve complex challenges, contribute to technical developments, and flourish in their engineering professions. The impact of factors such as motivation, perception, stress, teamwork skills, learning styles, and general self-efficacy on problem-solving skills in engineering students is studied by Bhadargade et al. (2020). It demonstrates that these psychological elements have a considerable impact on problem-solving ability. Motivation, perception, general self-efficacy, and teamwork abilities all have a favorable impact on problem-solving abilities. The findings imply that improving these psychological components can lead to better problem-solving skills in engineering students, emphasizing the necessity of integrating both technical and psychological factors in engineering education. Elaby et al. (2020) highlighted the effectiveness of real-world simulations in improving students' problem-solving skills. It also highlights the importance of aligning educators' assessments of problem-solving skills with students' viewpoints. A key finding is that engineering educational institutions must modify curricula with growing professional practices in order to enhance problem-solving skills.

Burkholder et al. (2021) found the importance of incorporating authentic design and problem-solving practice into undergraduate curricula. It implies that contrary to popular opinion, students frequently lack expert-level problem-solving ability. They have difficulty recognizing significant problem aspects, detecting design flaws, and suggesting design modifications. While students are becoming more adept at determining relevant facts, there is still space for improvement in problem-solving skills through curriculum modifications. This refers to the significance of improving engineering education in order to better prepare graduates for professional practice. The findings of a study by Ergin et al. (2020) indicate that engineering students' emotional intelligence and problem-solving abilities influence their academic progress.

The study by Mavridou & Nanos (2023) points out that effective engineers must not just address technical obstacles, but also have a keen understanding of the larger context in which problems exist. Collaboration with multiple stakeholders, such as clients, users, and communities, is required to fully understand the demands, constraints, and potential implications of suggested solutions. Furthermore, the study highlights that ethical engineering includes not just satisfying the needs of customers but also taking into account the needs of users, communities, society, and the environment. Collaboration with a variety of stakeholders can inspire the creative design and lead to great outcomes. It does, however, admit that engineers may encounter ethical quandaries when competing requirements exist. The study reiterates the importance of effective communication, interpersonal skills, environmental awareness, problem-solving abilities, IT proficiency, self-directed and lifelong learning, as well as management and teamwork skills within the curriculum to improve employability and competitiveness in the global. This is also pointed out in the study by Schefer-Wenzl & Miladinovic. (2019).

An exhaustive review of existing research underscores the significance of communication, self-evaluation, leadership, team building, and problem-solving skills in crafting successful engineering graduates. These skills have emerged as vital for engineers to thrive in their careers. The influence of Industry-oriented Training (IOT) courses addressed in this study is strategically designed to foster and enhance these skill sets. The engineering education landscape is evolving to meet industry expectations, emphasizing graduates' comprehensive development to address the difficulties of the modern professional world. IOT is a concentrated effort to provide engineering students with the necessary skills for a successful career path.

TABLE I
PERCENTILE ANALYSIS

Gender * Communication Skill before Training Cross tabulation									Gender * Communication Skill after Training Cross tabulation								
			Communication Skill before Training					Total				Communication Skill after Training					Total
			1	2	3	4	5					1	2	3	4	5	
Gender	Male	% within Gender	0.0%	29.0%	29.0%	42.0%	0.0%	100.0%	Gender	% within Gender	Male	0.0%	1.4%	15.9%	36.2%	46.4%	100.0%
	Female	% within Gender	0.0%	47.6%	19.0%	33.3%	0.0%	100.0%			Female	0.0%	0.0%	11.9%	42.9%	45.2%	100.0%
Total		% within Gender	0.0%	36.0%	25.2%	38.7%	0.0%	100.0%			% within Gender	0.0%	0.9%	15.3%	36.9%	46.8%	100.0%
			Team Building Skill before Training					Total				Team Building Skill after Training					Total
			1	2	3	4	5					1	2	3	4	5	
Gender	Male	% within Gender	0.0%	43.5%	24.6%	31.9%	0.0%	100.0%	Gender	% within Gender	Male	0.0%	1.4%	13.0%	44.9%	40.6%	100.0%
	Female	% within Gender	0.0%	38.1%	31.0%	31.0%	0.0%	100.0%			Female	0.0%	2.4%	7.1%	40.5%	50.0%	100.0%
Total		% within Gender	0.0%	41.4%	27.0%	31.5%	0.0%	100.0%	Total		% within Gender	0.0%	1.8%	10.8%	43.2%	44.1%	100.0%
			Self-Evaluation Skill before Training					Total				Self-Evaluation Skill after Training					Total
			1	2	3	4	5					1	2	3	4	5	
Gender	Male	% within Gender	0.0%	40.6%	21.7%	37.7%	0.0%	100.0%	Gender	% within Gender	Male	0.0%	1.4%	17.4%	37.7%	43.5%	100.0%
	Female	% within Gender	2.4%	47.6%	19.0%	31.0%	0.0%	100.0%			Female	0.0%	0.0%	11.9%	35.7%	52.4%	100.0%
Total		% within Gender	0.9%	43.2%	20.7%	35.1%	0.0%	100.0%	Total		% within Gender	0.0%	0.9%	15.3%	36.9%	46.8%	100.0%
			Problem Solving Skill before Training					Total				Problem Solving Skill after Training					Total
			1	2	3	4	5					1	2	3	4	5	
Gender	Male	% within Gender	0.0%	29.0%	29.0%	42.0%	0.0%	100.0%	Gender	% within Gender	Male	0.0%	1.4%	15.9%	36.2%	46.4%	100.0%
	Female	% within Gender	0.0%	47.6%	19.0%	33.3%	0.0%	100.0%			Female	0.0%	0.0%	11.9%	42.9%	45.2%	100.0%
Total		% within Gender	% within Gender	0.0%	36.0%	25.2%	38.7%	100.0%	Total		% within Gender	0.0%	0.9%	15.3%	36.9%	46.8%	100.0%
			Leadership Skills before Training					Total				Leadership Skills after Training					Total
			1	2	3	4	5					1	2	3	4	5	
Gender	Male	% within Gender	0.0%	43.5%	24.6%	31.9%	0.0%	100.0%	Gender	Male	Male	0.0%	1.4%	13.0%	44.9%	40.6%	100.0%
	Female	% within Gender	0.0%	38.1%	31.0%	31.0%	0.0%	100.0%		Female	Female	0.0%	2.4%	7.1%	40.5%	50.0%	100.0%
Total		% within Gender	0.0%	41.4%	27.0%	31.5%	0.0%	100.0%	100.0%		% within Gender	0.0%	1.8%	10.8%	43.2%	44.1%	100.0%

III. RESEARCH HYPOTHESIS AND METHODOLOGY

A. Problem statement

Engineers with advanced abilities and expertise are in high demand in the contemporary dynamic and rapidly evolving technological world. However, it is frequently observed that a significant percentage of engineering graduates lack practical, industry-specific training, which is crucial to professional success and making valuable contributions to the corporate world. The lack of essential abilities and competencies inhibits their capacity to respond effectively to the evolving needs of diverse sectors, as well as their potential for creative thinking and problem-solving. Most engineering programs lack adequate alignment with industry-required fundamental capabilities such as project management, teamwork, communication, and problem-solving abilities. The table II depicts the mean and standard deviation of the selected samples before and after IOT training on problem solving. Each "pair" corresponds to a specific talent, and the statistical data include the mean (or average) and standard deviation for both the pre-training and post-training ability levels. The data indicates an overall change in the student's skills. Keeping the standard mean at 3, Table II shows that, with the exception of communication abilities, the majority of the students' skill sets were below average before the IOT session.

B. Research questions

The research questions are framed through the feedback from the Industry partners

1. Does the Industry Orientation training have an impact on the student's overall skill set?
2. Does the Industry Orientation Training program improve graduates' employability?

C. Objectives of the Study

1. To determine the influence of Industry Orientation Training on communication skills.
2. To evaluate the impact of Industry Orientation Training on team-building abilities.
3. To assess the influence of Industry Orientation Training on self-evaluation skills.
4. To evaluate the impact of Industry Orientation Training on problem-solving abilities.
5. To examine the influence of Industry Orientation Training on team management abilities.

D. Research Methodology

First-year students of Bachelor of Engineering and Master of Business Administration were chosen for the current study. The responses diversity included 42 female and 70 male students. The responses were collected from students through a Google Form. The questionnaire included the following:

1. Before participating in the Problem Solving Skills training program, please rate your confidence and skills in the following areas on a scale of 1 to 5 (1 = Very Low, 5 = Very High): Communication Skills, Team building skills, Self-evaluation skills, Problem solving skills, Team Management.
2. How satisfied were you with the Industry Oriented Training program overall? (1 = Very Dissatisfied, 5 = Very Satisfied)
3. Did you find the activities and challenges in the program relevant and practical for real-world career situations?
4. Please share any specific activities or sessions from the program that you found particularly beneficial for your career development.
5. After completing the Problem Solving Skills training program, please rate your confidence and skills in the following areas on a scale of 1 to 5 (1 = Very Low, 5 = Very High): Communication Skills, Team building skills, Self-evaluation skills, Problem solving skills, Team Management
6. How satisfied were you with the Industry Oriented Training program overall? (1 = Very Dissatisfied, 5 = Very Satisfied)
7. Do you believe that the Problem Solving Skills training program will influence your career development and readiness for the corporate world?
8. Have you applied any of the skills or knowledge gained from the training program in internships, projects, or any other situation? If yes, please elaborate
9. If yes, please rate the effectiveness of these skills in helping you in these situations on a scale of 1 to 5 (1 = Not Effective, 5 = Very Effective)
10. How would you rate the overall delivery of the Problem Solving Skills training program by the facilitators?
11. Please provide specific examples of facilitator-led activities or sessions that you found particularly engaging or effective during the training program.
12. How well did the facilitators create an inclusive and participatory learning environment during the training program?
13. Reflecting on your own participation, how actively engaged were you in the Problem Solving Skills training program?
14. Did you collaborate effectively with your fellow students during group activities or projects in the training program? Please describe any group activities or collaborative projects that you found particularly beneficial for your learning and engagement.
15. How would you rate the knowledge and expertise of the facilitators in delivering the Problem Solving Skills training program?
16. Were the facilitators approachable and receptive to your questions and feedback during the training program?
17. How satisfied were you with the Problem Solving Skills training program overall?
18. Do you have any suggestions or recommendations for improving the Problem Solving Skills training program.

The sample size for the study was 112. Paired t-test is used for data analysis.

$$\text{Paired t-test (t): } \frac{\bar{x}-M_o}{S/\sqrt{N}} \quad (1)$$

E. Research Hypothesis

H1: There is significant improvement in the communication skills of the student's post-training

H2: There is a significant improvement in the Leadership skills of the students post-training

H3: There is a significant improvement in the self-evaluation skills of the students post-training

H4: There is a significant improvement in the problem-solving skills of the students post-training

H5: There is a significant improvement in the team management skills of the students post-training

TABLE II
PAIRED T-TEST ANALYSIS

Details of the pair		Mean	Std. deviation
Pair 1	Overall Skill before Training	14.68	3.530
	Overall Skill After Training	21.5045	3.31079
Pair 2	Communication Skill before Training	3.03	0.868
	Communication Skill After Training	4.30	0.746
Pair 3	Team Building Skill Before Training	2.90	0.852
	Team Building Skill After training	4.30	0.734
Pair 4	Self-evaluation Before Training	2.90	0.904
	Self-evaluation After Training	4.30	0.758
Pair 5	Problem Solving Before Training	2.88	0.871
	Problem Solving after Training	4.26	0.747
Pair 6	Leadership Skill Before Training	2.96	0.914
	Leadership Skill After Training	4.35	0.722

IV. RESULTS AND DISCUSSIONS

Table I provides an overview of the study's sample and also the demographics of the students. The pre and after-training impact was scaled from 1 to 5 (1- Low, 2- Moderate, 3- Neutral, 4- High, and 5- Very High). The findings demonstrate that post training, students' opinions of the training program and its impact on communication skills, team building, self-evaluation, problem solving, and team management skills increased. The results indicate that, on average, the maximum sample chosen for the study benefited from the training and improved in the selected skill areas.

Based to the results, the training program had a positive effect on all of the examined skills, as demonstrated by substantial improvements in skill levels across all domains following the training. The observed decrease in standard deviations after the training program indicates a higher degree of homogeneity in skill levels among participants, confirming the training program's efficacy in supporting skill growth.

The data presented in Table III represents the results of a paired samples test performed on unique pairs of skills both before and after training. The paired samples test findings show that the overall influence of the IOT on training programs and the specified skillsets is statistically significant. The results showed that the test P value has a significance threshold of less than 0.05, indicating that there is a significant impact on the skillsets following IOT training. The study underlines the importance of training programs in improving students' competency.

The programs provide a systematic and targeted process for acquiring knowledge, enabling students to acquire specific skills that are essential in both academia and the business world. IOT course give students the tools they need to thrive in their

TABLE III
PAIRED SAMPLES TEST

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Overall, Skill	-6.82883	3.17626	0.30148	-7.42629	-6.23137	-22.651	110	0.000
Pair 2	Communication Skill	-1.270	0.797	0.076	-1.420	-1.120	-16.790	110	0.000
Pair 3	Team Building Skill	-1.396	0.823	0.078	-1.551	-1.242	-17.870	110	0.000
Pair 4	Self-evaluation	-1.396	0.917	0.087	-1.569	-1.224	-16.038	110	0.000
Pair 5	Problem-Solving	-1.378	0.798	0.076	-1.529	-1.228	-18.190	110	0.000
Pair 6	Leadership	-1.387	0.906	0.086	-1.558	-1.217	-16.129	110	0.000

chosen sectors by training them in technical skills, enhancing their problem-solving talents, and nurturing their critical thinking abilities. The study's findings show that the students' selected skill sets were improved by the Industry Orientation Training. According to the findings, the IOT program enables students to remain current on industry trends and technology, strengthening their competitiveness and adaptability in a rapidly changing employment landscape. IOT courses not only improve employment chances, but they also help with personal development, self-assurance, and fostering a mindset of perpetual learning. Finally, educators have an important role in equipping students with the tools and information required to succeed in a quickly changing and competitive global context.

V. Conclusion

The study analyzed the impact of Industry-oriented Training on Bachelor of Engineering and Master of Business Administration students, with a focus on the development of essential life skills. The research discovered compelling evidence of the positive impact this training has had on their personal and professional progress by collecting feedback from students who participated in this specialized course and subjected the data to rigorous statistical analysis. The data clearly show that this training program not only provided students with valuable abilities but also empowered them to apply these talents effectively in real-world circumstances.

The data demonstrate that the training program had a significant and beneficial impact. This data highlights its efficacy in not just equipping students with valuable skills, but also enabling them to apply these competences effectively in practical, real-life scenarios. The students' collective agreement, supported by statistical evidence, gives a convincing endorsement of the program's efficacy. In the context of increasing competitiveness and dynamic change, the study emphasizes the critical necessity of educational efforts that promote holistic development. The study points out the need to prioritize and innovate in the field of experential

learning and positively indicates the role of activity based learning and its impact on skill development.

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