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Bridging the Divide: Analyzing the Gap Between Engineering Education and Industry Institute Interaction in Kerala

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***Abstract-* This thesis is mainly about interactions between engineering educational institutions and industrial institutions in Kerala. In India itself, Kerala had a high rating in terms of education, but students in Kerala, especially students in engineering education, faced many difficulties in getting the jobs they wanted. There was a gap between educational institutions and industrial institutions. The main reason for that gap was the misalignment of curricula, and teachers had a lot to say about its importance. These reasons often resulted in insufficient involvement from industry in educational institutions. Even if they were brilliant students, there were not enough opportunities for industries to take notice of them.**

But this problem can be solved to some extent through curriculum reform to fill this gap, faculty development, collaboration with industry academia, and support from the government. This thesis addresses the bridging or potential bridging of the gap between industry and educational institutions.

In recent times career was not given much importance other than to make the students smart as taught by the educational institutions but according to the changed situation students after graduation in one of the special professional courses like engineering give great importance to the job. They are looking for their job prospects after their studies or along with their studies because the importance of which institutes are providing it i.e. which educational institutes are providing placements is now becomes more important and that is what this paper is about discussing.

***Keywords:* Practical Exposure, Industry Engagement, Skill Shortage, Curriculum Reform, Economic Impact**

I. INTRODUCTION

In today's modern times, the relationship between industry and education is inextricable. As much as it is possible to take it in a strong relationship, only taking it will be fulfilled because as we know there are some traditional courses in our country but related to that the students are not really getting a job or they are not able to have a life situation that they want. Education is not only meant to make them stand on their own feet but it also leads to the progress of the country and is of great importance for economic development. (Song et al., 2022, Aval & Vosoughi, 2014)

There is nothing wrong with studying a subject just to get an education, but when studying a technology-related subject like engineering and not getting a commensurate job or salary, the students understand that they were not studying in the right courses. Later, it has started to change to educational institutions as well (Chaname-Chira et al., 2024). It is at this time that the importance of the relationship between educational institutions and industrial institutions is understood and the fact that the society has to embrace the changing education has to be embraced by the students, guardians, and teachers.

Now even in Arts and Science Colleges in Kerala itself, the three-year degree has been changed to four years because of the need to give great importance to the relationship between education and industry. Another important thing is that the students can benefit from the technology and the industry and they can help the industry as well. The opportunities for students of educational institutions including foreign countries to interact with the industry are much higher as compared to Kerala.

So, a committee is formed in the educational institutions and the students are told about its importance. It also promotes instruction and development through joint projects by merging academic knowledge with industry. It will help transfer new technologies and research findings to the industry and promote commercialization and product development. Industries are further stimulated by giving opportunities to not only students but also teachers to work on industry-related projects. Not only that, the financial benefits for the states are also huge. For that purpose, industries are trying to follow the current educational methods by giving importance to the practical matter in the way of workshops and seminars. Government policies, initiatives, and many other things need to create an environment that fosters this. In this way, interested students will recognize the importance of research focus and focus on developing entrepreneurial skills among students (Armnazi & Alegasan, 2024).

II. Background of the Study

An important component of engineering education is the interaction between industry and educational institutions, i.e. industry-institute interaction (Rajaram, 2018) This has a great impact on the career development of students, especially in Kerala. According to one method in Kerala industrial establishments are a little less than in other states but industrial establishments have to give a lot of importance to things like industrial institutes. Because the main purpose is not that they should not get jobs in Kerala only. Students should grow as they wish after completing their education. The interaction between industry and educational institutions needs to grow rapidly, which is huge for engineering students. Most importantly, they get right down to the practical side of the core of their field. For that, they get internships, industrial visits, seminars, projects, etc. Now, through such committees in colleges themselves, students can raise the level of industry participation to a much higher level (Moghadam et al., 2014). Moreover, the possibility of networking with professionals, making connections, and getting job offers is huge. But how effectively it is implemented is another important issue. In this way, it is possible to provide new trends and developments and raise the standard of education by intervening in the educational affairs of industrial establishments. On the other hand, students can study complementary curricula for industrial establishments or contribute to industries along with their studies. It helps a lot in research projects etc. It can provide many benefits not only to industries but also to educational institutes. Hence, promoting interaction between industry and educational institutions is essential nowadays.

III. Statement of Problem

It is essential that education changes according to the changing needs of the modern industry. Or else only the institutions that follow it will survive. By encouraging students to study a variety of disciplines and collaborate with industry, educational institutions can produce engineering graduates with the skills to meet the needs of the modern workforce (Khalikova et al., 2024). Interdisciplinary knowledge thereby not only enhances the employability of graduates but also encourages innovation and opens avenues for new employment opportunities. Bridging these gaps in skills will have a huge role to play for the industry (Remadevi & Ravi Kumar, 2017). Collaboration between industry and institutions is critical in shaping an educational framework that not only meets current job demands but also anticipates and prepares students for future challenges in the professional field.

IV. Research Gap

Here the educational institutes that take industry-institute interaction into practice appear to be excelling in all respects (Ye et al., 2020). It can be seen whether it is in terms of admissions, whether it is in terms of employment opportunities, whether it is in terms of the quality of teachers, and it is reflected. But for this, we have used some educational institutes for study here where industry-institute interaction is not very important. From that, it was understood that there is a big difference between the educational institutions that implemented this and the institutions that were not so effective. In the future, especially in engineering, its importance is very high, because we all know how important it is to industrial organizations when it comes to professional courses like engineering. That's where the gap emerges where students and industry want to deliver what they want or who can't. So essentially this study is intended to be a study between firms that have implemented industry institute interaction and firms that have not implemented it so effectively.

V. Review of Literature

Several journals were used for reference as part of the research. He interacted with those working in the new field and those working in the institutions. We were able to understand many important things from them. Even if it is not so clear in many journals, our work later on made it clear that we need to increase our interest in industrial companies and how to increase them. Categorization was done based on that and it was categorized as Urban Rural. Based on that, the study was conducted based on understand how successfully the educational institutions operating in those parts are working and how their industrial institute interaction is working. We have received some clear reports through it. The literature review for our research work was from the best journals. All important points derived from it were included.

However, the article breaks down where our journey to sustainability meets with capabilities within this relatively new area of Sustainability and I.T. Supply Chain 4.0 - canvassing how emerging information technologies can significantly raise aspects of your company's sustainable profile all centered on helping actively generate sustainability goals. This article focuses on the TBL (Triple-Bottom-Line) methodology as an operational path to highlight how digital technologies can transform supply chain sustainability at a threefold level: economically, environmentally, and socially. The article further highlights the applicability of TOE theory to environmentally-oriented (green) supply chains in achieving sustainability outcomes through digitizing SCs and offers insights for practitioners (Hlushenkova et al., 2024). Related: From a more environmental and socially responsible supply chain to how digital technologies can help in doing so. (Sustainability and the Digital Supply Chain)

This article argues that knowledge stocks and flows can be built up, and improved upon through interaction by propagating technology development and innovation at the intersection of universities with industry (Eckhart et al., 2019). The author stresses the different incentives of both universities and industry in terms, inter alia of receiving funding, and output data empirical from scientific knowledge, ensuring that qualified staff can function at every facility service for research or teaching (industrial plants). This document examines the stakeholder roles in university-industry collaboration and interrelations, illustrating needs concerning knowledge provision/ facilities availability/ reduction of R&D costs to industry partners. In conclusion, this article gives us an enlightening perspective on University-Industry collaboration in advancing technology and innovation across different industries. (Research) India, March 2018 (Science Technical University-Industry Linkages: Towards a New Generation of Technologies: Country Report)) (2023 University-Industry Collaboration A Way to New Technologies)

This article has made detailed exploration and discussion on the practical teaching methods of cybersecurity professionals, highlighting the importance of using application scenarios to carry out training for security practitioners in combination with industry demands due to its demonstration role model which is more essential in effectively carrying out industrial-education integration explorations. How the partnership ecosystem model works: A case study of Cybersecurity Technology Service Center (CTSC) (Karimov et al., 2024). Wenzhou Polytechnic unveils an integrative participation culture for colleges, government as well as enterprises to build good applied networks and information security personnel. The document proposes a new model of training application-oriented talents, aiming at culturing talents using the PDCA closed loop that alternates customized scheme development with collaborative industry-education action and supplemented with post-practice assessment to constantly upscale the DR strategies. This article also exposes industry-education collaboration to develop cybersecurity talents and a broad framework for tailoring the training of practical professionals in full text (Study on the Improvement Path of Teaching Ability of Higher Vocational Teachers under the Perspective promoting Teaching through Competition) (2022 Study on the Improvement Path of Teaching Ability of)

The article mentions how relevant the integration of production (Chu, 2022) and education in models for training talent is, stressing the necessity of 'double-qualified' teaching staff of such quality with moral cultivation, theoretical knowledge, and practice skills in their integrated process of education. More traditional forms of evaluation in universities were criticized, calling for more inclusive, deeper, and objective evaluations that take input from all stakeholders in the learning chain. The article proposes new models for application-oriented undergraduate talent training through collaboration between industries and universities to show its notable impact of transformation as a replacement to the traditional framework of education through the development of applied talents.

In the concluding remarks, it recommended innovative reforms of innovative teacher education, deepened cooperation between industry and academia, and all-around character building for students, making this an edifice in the advancement of quality education and talent cultivation in application-oriented undergraduates (“Research on a New Mode of Integration of Production and Education for Applied Undergraduates,” 2022). (2022 Research on a New Mode of Integration of Production and Education for Applied Undergraduates.)

This article provides a detailed framework for the education of graduate students in computer science and technology, with emphasis placed on innovation as a means to enhance national competitiveness (Armstrong, 2000). It proposes a scheme of diversified mode that requires development to assemble an interdisciplinary mentor team that will match the resource requirement of scientific research projects and businesses, thus enhancing students' abilities to innovate. The paper calls for reform in education to focus on enhancing action-ready skills through connecting with a lot of practical resources. In broader strokes, the paper depicts a strategic way of fostering innovation and developing practical skills pertinent to the cultivation of high-quality professionals in the field. (2022 Education and Information Technologies)

The article urges the merging of production and education with training models to produce more qualified people. Proposes how a double-qualified worker would bring better results of education a priority for national development: quality over quantity and profit in determining the hiring ratio, hence establishing a balance between theoretical knowledge and practical training in productive integrated education. After criticizing the present methodology of rating universities, the article laments the challenges of evaluating students' professional skills and urges in favor of an inclusive and integrated evaluation system that takes into consideration multiple stakeholders. An application-oriented talent training framework for undergraduates regarding production and education integration is thereby expressed, discussing its formulation: one of changing the outlook on education and production in nurturing applied talents through collaborations by academia and industry (Katsaliaki et al., 2022) (2021 Supply Chain Disruptions and Resilience: A Major Review).

These articles are mainly related to the existing problems and challenges in robot engineering training in China, such as non-practical ability training, and industry-university mismatch between school knowledge and market demand. They talk about how the training system requires a complete reform, combining competition education and research education to improve students' practical and innovative capabilities for robot engineering. It pays close attention to the establishment of joint laboratories, competition system reform, and scientific research project selection mechanism as well as addresses how robot engineering education could incorporate theoretical knowledge with practical skills. In summary, these articles offer valuable ideas for improving the drawbacks of existing training systems and put forward feasible measures to build top-notch innovative engineering application talents in the robot industry. (Research on Practical Teaching Mode of Robot Engineering Specialty with Integration of Competition-education and Research-education)

Based on this, the author proposed the "Wisdom and Intelligence of Extraordinary Features" driver mobile high-quality applied medical talent training mode in implementing a 4-in-1 full coverage area disc. Educational informatization is highlighted, in which science and education are combined with production and education, and theory hits practice to improve the quality of training. It has effectively promoted students' humanistic literacy, practical ability, and innovation entrepreneurship capability as well as post-competence school running level, and graduation rate improvement. In short, the article affirms that it is necessary to make good use of the mode and confirm again its positive effect on cultivating medical talents as well as appeals for intelligent cultivation and strategic reform in higher education(Liao et al., 2021). (Innovation and Practice of “Four-in-One” Medical Talent Training Mode Driven by “Wisdom, Integration and Characteristics”)

This article explains that the preparation of creative professionals is important for improving national competitiveness in computer science and technology, by proposing a training framework for graduate studies that emphasizes rich resources, scientific research projects, and industry's demands. He discusses how mathematical modeling competitions are important for fostering innovation and problem-solving skills in graduate students based on insight, imagination, and logical thinking. Subject competition-driven reform is proposed about optimizing discipline competition resources and improving education quality. The need to train high-quality professionals who contribute to social development trends and state-of-the-art international competitiveness is emphasized, along with the need to unleash graduate students' innovation potential within the framework of national development strategies. In addition, it proposes that diverse cultivation modes with study areas connected to industry needs and future employment goals are essential to enhancing innovation capacities (Chen et al., 2021). (2021 Innovation Ability Cultivation of Graduate Students of Computer Science and Technology under the Background of Science and Education Integrated)

The article examines the urgency with which machine-learning systems need to be integrated across industries, sufficiently represented as alternative personas for the complexity underlying their action and decision-making, thus reworking workplace strategies to increase human-machine cooperation and productivity. The paper thus strongly promotes educational reforms for a solid foundation in machine learning and its other literacies recognized as relevant to human learning and its processes with machine learning. The limitations of current approaches to teaching will be noted, and experiential learning and the introductory special explainable AI models will be juxtaposed to engage better with students. It reiterates the need for algorithmic literacy and ethics in machine learning education because that would equip learners to inquire critically and act responsibly relative to the effects of AI algorithms in society (Webb et al., 2021). (2020 Machine learning for human learners opportunities, issues)

This article emphasizes a transition in undergraduate colleges dependent on applied courses, integrating industries and education and collaborations between schools and the firms. It thus highlights the importance of a complete evaluation mechanism in talent creation involving the participation of teachers, students, and enterprise managers in training skilled personnel. It also highlighted the issue of professional skills training for teachers, working shoulder to shoulder with enterprises in establishing the "double-qualified" teaching faculty. This dealt with the exploration of mechanisms for university-industry integration and collaborative education models in private colleges. The only solution required is strong backing from the government so as to motivate cooperation between universities and technology transfer. This whole paper is an effort to address certain problems and opportunities for integrating education and production in applied undergraduate colleges while advocating very strongly for academia-industry collaboration in training skilled manpower for the future employment market (Ye et al., 2020). (Exploration_and_Research_on_the_Training_Path_of_C)

The present article advocates the establishment of partnerships between other organizations and education for high-quality talent recruitment in the industry (Webb et al 2021). It talks about varied present obstacles in talent assessment and training in colleges and universities and pitchers for better extensive objective-assisted assessment processes, inclusive of all participants in the process. It discusses some innovative models of industry-education integration that have shown promise in improving engineering education and competency in its students. It discusses the urgency to transform these traditional undergraduate universities into application-oriented institutions where industry-academia collaboration is put in place and skill development is promoted. Overall, this article therefore provides fairly new insights into the transformations of applied undergraduate colleges, with specific emphasis on industry collaboration and the development of practical skills in students, all of which are essential for competition or a job search in this market (Tseng et al., 2020).

By focusing on the graduate outcomes in computer science and technology being directed towards enhancement of the national competitiveness through innovation, the article discusses the development of graduate students. It entreats inspired and diversified cultivation modes and mixed mentor-team compositions to develop the students' innovative capabilities aligned with the research and industrial needs. In the process of education reform, great emphasis goes to practical training with a variety of resources at hand to strengthen the innovation skills of graduate students. Overall, it gives other useful strategies for producing high-quality professionals in computer science and technology, providing other concepts of intrinsic necessity for development in innovation and practical skills (Innovation Ability Cultivation of Graduate Students of Computer Science and Technology under the Background of Science and Education Integration).

Studies and industries have been fostering cooperation for long over a century, but the phenomenon of the global knowledge economy has accelerated the demand for strategic partnerships. The institutes impart the basic knowledge and skills; however, the industry-institute interface will sensitize the staff and students to research industry-based topics. The industry-institute cooperation should therefore be of long duration, which will prepare world-class technical manpower in the field of science and technology with more problem-solving skills desired by the industry. This article, being more focused on technical education, cannot afford to miss out on the interrelationship between education and industry. Technical education serves to be the backbone of the socioeconomic development of any country. While interacting with the industry, the journey of partnership with the institutes has developed different shapes at different points in time. The development started with a very peripheral relationship, but over the ages encouraged a close affiliation. India has among the largest technical manpower in the world. But this is insignificant when the population is considered and there is still ample scope for further developments. Bridging the skill gap is the need of the hour that checks on national development and economic growth. (Industry Institute Interaction)

Collaboration between universities and industry is increasingly seen as a means through which innovation is enhanced by knowledge exchange. This is a general overview of studies on the subject. However, this area remains relatively unexplored, with patchy and insufficient development of theory or adequate conceptualization. In this context, the present study had undertaken a systematic literature review of university–industry collaboration. The review led to the identification of five key components inherent in the theory of UIC. These components form the basis of a rich process framework that contributes by providing an integrated analysis of the literature around this phenomenon along that review. Some lines of research are reported to have distilled from the analysis. (Universities-Industry Collaboration: A Systematic Review Article)

Practices to close the training gap between the industry and the institute and increase a student's employability have been found through the analysis of a case of collaborative training developed from an institute-industry alliance to provide learners with adequate exposure to new technologies. Quality technical education that makes graduates employable, skilled, and equipped must be the main goal of any engineering firm, but it need not be the only one. For the academic community to be actively and positively involved in entrepreneurship and contemporary technical education, industrial relationships are essential. The procedures described in the study show how to ensure complete excellence through industry-institute engagement and collaboration while also preparing graduates for employment.

Industries would pursue the desired goal of sustainable models for engaging and outreach activities with institutions. The Authorizations would be viable through appropriate and dynamic systems and strategic activities to bridge the gap. Industries and organizations working closely with the institutions can come up with innovative solutions for the Problems faced Today by mankind. To qualify techno-managers for the global market and make them employable, is one of the principal objectives of any technical institution. This paper is primarily on the Industry Education Cell that has successfully been constituted in their college. The success at any other institution is left to be assessed as how it achieves the goals of the study. III is the ideal mechanism for mutual benefit and growth of industries/institutions. III in our institute, practices like involving the industry in the curriculum design and evaluation systems were performed, and it had come up with an important contribution in making the graduates ready for Industries. Placement of the students with the industries for fixed periods so that students get ample opportunity for getting internship-based industrial training, Industry-defined final-year projects, and real-world challenges which would help enhance the teaching-learning processes. This enhances Research and Development activities back at our institute and the industry. (Initiatives & Strategies for Enhancing Industry Institute Interaction (III): Practices at Birla Viswakarma Mahavidyalaya (BVM), Gujarat, India)

Objectives

- To evaluate the status of professional educational institutions in Kerala, regarding engineering education.
- To analyze the effectiveness of industry-institute interaction in professional educational institutions of Kerala with an emphasis on engineering education.
- To analyze the impact that may arise from the implementation of suggested solutions, particularly for tier-two educational institutions.

Hypothesis

1. *For Institutions*

- H0= The null hypothesis states that an agreement between institutional categories and their Induction Program is statistically insignificant.

- H0= The null hypothesis states that there is not a statistically significant difference between institutions based on zones about their induction programs.
- H0= The null hypothesis states that there is no statistically significant variation in the induction program of the institution for undergraduate accredited NBA programs.
- H0= The agreement about III of school education does not vary significantly in the institution.
- H0= According to the experience in the industry, there is no statistically significant difference in the agreement regarding the induction program of the institution.

2. For Industry

- H0= The null hypothesis states that there is no statistically significant variation in the institutions' agreement over their induction programs based on the type of induction program.
- H0= The null hypothesis states there is no significant difference within the institution, as those three groups pertain to such different induction programs.
- H0= According to the null hypothesis, age does affect induction programs across the institutions, meaning the final evaluation did show statistical significance through consideration of the particular age group.

VI. RESEARCH METHODOLOGY

For research methodology, the engineering colleges in Kerala were categorized into three categories i.e. South, Central, and North and then we re-categorized it again as rural and urban and again we categorized South, Central, and North. For a more authoritative and reliable data collection, we have again done a categorization of rural and urban in the order of tier one and tier 2. For data analysis we have used things like T test, independent test, anova, etc. whether for institute or industry. We used such statistical tools as a part of taking the report in engineering colleges very accurately. This resulted in a total sample size of 456. 58 samples obtained from students of selected engineering colleges in Kerala and industry were also used for the sample test. The data for the period from 2015 to 2020 has been used for our research.

VII. SCOPE OF THE STUDY

This study was conducted in the context of engineering education in Kerala. It was possible to understand the distance between the industry and the institution and the challenges arising from it. Despite Kerala's strong education system and numerous engineering colleges, the gap remains due to outdated curricula and limited industrial engagement. To address this, the paper proposes a comprehensive analysis involving curriculum reform, faculty development, robust internship programs, industry-academia collaboration, and an emphasis on soft skills and entrepreneurship. Case studies from Germany, Silicon Valley, Singapore, and IIT-Madras offer insights into effective strategies. Tailored solutions for Kerala include curriculum modernization, industry collaboration hubs, faculty development, mandatory internships, soft skills training, fostering an entrepreneurship ecosystem, and government support for industry-academia collaboration forums.

VIII. ANALYSIS & INTERPRETATION

Coding for the Variables of Hypothesis 1

To ensure code readability and professionalism, table I reveals variable codes. It is essential to follow standardized conventions when reading and writing code for variable declarations. Each hypothesis should be accompanied by distinct, purposeful code snippets, promoting an organized and modular structure. By adhering to clear naming conventions, consistent indentation, and comprehensive documentation, one can enhance the overall professionalism of the codebase, facilitating debugging and maintenance. In summary, a professional approach involves applying coding conventions, using unique codes for each hypothesis, and maintaining consistency for a cohesive and readable codebase.

TABLE I SHOWS THE CODE READABILITY AND PROFESSIONALISM

Variables	Variable Codes
You are very familiar with the concept of III systems in your College/University/Institution.	A-OV1
The campus placement in your college is going very well.	A-OV2
The quality of education and training provided by your College/University/Institution is excellent.	A-OV3
The curriculum of your institute is very much in tune with the current industry needs and requirements.	A-OV4
Your campus placement training process has been greatly enhanced to better meet the needs of candidates with key competencies (technical skills and strong subject knowledge and attributes) expected by recruiters.	A-OV5
You are satisfied with your current campus placement drive in your college, especially in your main domain.	A-OV6
A thorough analysis of the status of your institution concerning engineering education is required.	A-OV7
Overall, of the listed variables 1	A-OV

Hypothesis: 1

H0: There is no significant influence among the factors within Institutional competency

Agreement on the III of the Institution -One Sample T Test

1. *Overall Study of The Variables - One Sample T-Test*

TABLE II SHOWS THE AGREEMENT ON THE III OF THE INSTITUTION -ONE SAMPLE T TEST

Variables	Mean	SD	T – Value	P – Value
A-OV1	3.40	0.990	8.705	<0.001**
A-OV2	3.81	0.917	18.783	<0.001**
A-OV3	3.96	0.811	25.182	<0.001**
A-OV4	3.34	1.017	7.183	<0.001**
A-OV5	3.54	0.967	11.817	<0.001**
A-OV6	3.42	1.076	8.353	<0.001**
A-OV7	3.96	0.749	27.500	<0.001**
A-OV	3.63	0.664	20.341	<0.001**

Source: Primary Data

Based on the analysis table II found that all the respondents agree to the fact that the engineering institutions have III status. Wherein A-OV3 & A-0V7 as highest ($\bar{X}$=3.96) and A-OV4 as the least ($\bar{X}$=3.34). The analysis also indicates the result of one sample t-test where the p-value is less than 0.001. Hence it is concluded that the mean value (3.63, SD = 0.664) was significantly different from the population mean; t (454) =20.341, p-value <0.01.

2. *Industrial Experience - Independent Sample T-Test*

H_0= There is no significant difference in the agreement on the III of the institution concerning the industrial experience.

TABLE III SHOWS THE AGREEMENT ON THE III OF THE INSTITUTION - INDEPENDENT SAMPLE T-TEST FOR INDUSTRIAL EXPERIENCE.

Variables	Options	Mean	SD	T – Value	P - Value
A-OV1	Yes	3.72	0.833	3.722	<0.001**
	No	3.31	1.014		
A-OV2	Yes	3.95	1.004	1.821	0.069
	No	3.76	0.888		
A-OV3	Yes	3.90	0.834	-0.757	0.450
	No	3.97	0.804		
A-OV4	Yes	3.21	1.152	-1.459	0.145
	No	3.38	0.973		
A-OV5	Yes	3.61	1.087	0.913	0.362
	No	3.51	0.930		
A-OV6	Yes	3.42	1.015	-0.038	0.969
	No	3.42	1.095		
A-OV7	Yes	4.16	0.683	2.956	0.003*
	No	3.91	0.760		
A-OV	Yes	3.71	0.695	1.343	0.180
	No	3.61	0.654		

Source: Primary Data

The study on agreement on the III of the institution concerning industrial experience revealed in Table III, that in the case of A-OV1 and A-OV7, the response of students significantly differs from the one who has the industrial experience and who doesn't have the industrial experience (P-value < 0.05). While the overall result suggests that there is no significant difference between the students having industrial experience and students who don't have industrial experience concerning the agreement on the III of the institution: t(455)=1.343, p value>0.05.

Since the results of the independent sample t-test depicted a P value of greater than 0.05 the null hypothesis is accepted that there is no significant difference in the agreement on the III of the institution concerning the individual experience.

HYPOTHESIS 1:

1. *Coding For the Variables of Hypothesis 1*

TABLE IV REVEALS THE VARIABLE'S CODE

Variables	Variable Codes
The current state of III in engineering education in Kerala is excellent.	A-OV1
The approach of engineering institutes in Kerala towards III to enhance the employability of their students is very effective.	A-OV2
Engineering institutes in Kerala are implementing the best practices and initiatives to improve III.	A-OV3
On campus placement, you would expect all engineering colleges to have bright students with a more technical background.	A-OV4
Initiatives by the government or other stakeholders to promote and enhance IIIs in engineering education in Kerala are very high.	A-OV5
Please indicate your level of agreement with the following statement: A comprehensive analysis of the status of professional educational institutions in Kerala regarding engineering education is necessary.	A-OV6
Overall, of the listed variables 1	A-OV

2. *Overall Study of The Variables - One Sample T-Test*

TABLE V SHOWS THE AGREEMENT ON THE III OF THE INSTITUTION - ONE SAMPLE T TEST

Variables	Mean	SD	T – Value	P - Value
A-OV1	3.10	1.334	0.591	0.557
A-OV2	3.33	0.998	2.500	0.015*
A-OV3	3.19	1.034	1.397	0.168
A-OV4	3.62	1.335	3.540	0.001*
A-OV5	3.50	0.941	4.046	<0.001**
A-OV6	4.50	0.656	17.424	<0.001**
A-OV	3.54	0.708	5.805	<0.001**

Source: Primary data

Based on the analysis Tables IV and V found that all the respondents agree to the fact that the engineering institutions have III status. Wherein A-OV6 is the highest ($\bar{X}$=4.50) and A-OV1 is the least ($\bar{X}$=3.10). The analysis also indicates the result of one sample t-test where the p-value is less than 0.001. Hence it is concluded that the mean value (3.54, SD = 0.708 was significantly different from the population mean; t (57) =5.805, P-Value<0.05.

3. *Gender - Independent Sample T-Test*

H_0= There is no significant difference in the agreement on the III of the institution concerning gender.

TABLE VI AGREEMENT ON THE III OF THE INSTITUTION-INDEPENDENT SAMPLE T-TEST

Variables	Gender	Mean	SD	T – Value	P - Value
A-OV1	Male	3.15	1.389	0.378	0.707
	Female	3.00	1.225		
A-OV2	Male	3.15	1.108	-2.221	0.030*
	Female	3.76	0.437		
A-OV3	Male	3.10	1.068	-1.055	0.296
	Female	3.41	0.939		
A-OV4	Male	3.34	1.477	-2.594	0.012*
	Female	4.29	0.470		
A-OV5	Male	3.59	1.072	1.074	0.287
	Female	3.29	0.470		
A-OV6	Male	4.49	0.711	-0.218	0.828
	Female	4.53	0.514		
A-OV	Male	3.46	0.823	-1.219	0.228
	Female	3.71	0.218		

Source: Primary data

The study on agreement on the III of the institution with respect to gender revealed in Table VI that in the case of A-OV2 and A-OV4, the response of male recruiters significantly differed from the response of female recruiters (P-value < 0.05). While the overall result suggests that there is no difference between the recruiters concerning gender on the III of the institution: t(57)= -1.219, p value>0.05.

Since the results of the independent sample t-test depicted a P value of greater than 0.05 the null hypothesis is accepted that there is no significant difference in the agreement on the III of the institution with respect to gender.

IX. Finding and Suggestions

The paper delves into the critical issue of the misalignment between engineering education and industry-institute interaction in Kerala, India, highlighting causes such as curriculum misalignment and limited industry engagement. The consequences include unemployment and stifled innovation, necessitating solutions like curriculum reform, robust internships, and stronger industry-academia collaborations. The analysis identifies a division between tier one and tier two institutions, emphasizing the scarcity of industrial institutes and challenges in III implementation. The study proposes recommendations, including infrastructure improvement and faculty training, aiming to enhance III efficacy in tier-two institutions. The role of III in campus placements is very important and it envisages a skilled workforce to the level that drives the economic growth of Kerala. However, precise interventions cannot be proven to be universal. A research gap lies in the lack of accurate data measuring the associated outcomes as well as a detailed comparative analysis of successful international models of implementation in the Kerala context. Bridging these gaps is crucial for effective bridging and understanding of the gap between engineering education and industrial engagement in Kerala.

X. Conclusion

The importance of interaction between engineering education and industry in Kerala is said in this paper. Between them, the interaction between engineering education and industries is very and its benefits are huge. Kerala is very famous for education but the bright students coming out of it do not seem to get jobs in their desired institutes with corresponding salary or in their desired department. This will become a question for the very existence of engineering education in Kerala in the future. Therefore, it is possible to move forward successfully only if we find out what is the basic problem between them and eliminate it as soon as possible. This happened due to many reasons, the main reasons being that the education committee did not revise the syllabus at the right time, and some of the teachers, including the teachers, showed a backward attitude. But if all this is overcome, it will be possible to solve the problem of engineering students in Kerala to some extent.

In this era where industries are facing a shortage of professionals and in this era where the number of engineering students is increasing, there is great hope if we understand what the real problem is and solve it. So, based on those who are in this field and have studied in this field, it can be said that Industry Institute Engineering is an indispensable factor for colleges. In the future, industry-institute interaction will be very important. Already many leading engineering colleges especially autonomous or top-category institutions have established a very good relationship with the industry in all respects. So, it has a lot of importance in the future. Especially those colleges that are not implementing it or are not so active should go ahead with it very soon. In the future engineering colleges should tie up with such industrial institutes otherwise it will be very difficult to sustain especially in the present modern world.

References

[1] Armnazi, M., & Alegasan, M. (2024). Target Situation Needs Analysis of English Language Skills Required by Syrians in the Arabian Gulf Area. *Indian Journal of Information Sources and Services, 14*(3), 77–85. https://doi.org/10.51983/ijiss-2024.14.3.11.

[2] Armstrong, W. B. (2000). The association among student success in courses, placement test scores, student background data, and instructor grading practices. *Community College Journal of Research & Practice, 24*(8), 681-695. https://doi.org/10.1080/10668920050140837

[3] Aval, B. A., & Vosoughi, S. (2014). Properly trained with Looking specifically at Islamic economic system dominated and Article 44 of the constitution. *International Academic Journal of Humanities, 1*(1), 26–31.

[4] Chaname-Chira, R., Santisteban-Chevez, D., Tafur, K. M. R., Villalobos, P. G., Campos-Ugaz, W., Alcaide-Aranda, L. I. D. C., & Villegas, D. R. A. (2024). Critical Thinking and the Impact on University Education for Sustainable Development. *Indian Journal of Information Sources and Services, 14*(3), 93–101. https://doi.org/10.51983/ijiss-2024.14.3.13.

[5] Chen, J., Yang, M., Guo, Y., & Zhang, H. (2021). Innovation ability cultivation of graduate students of computer science and technology under the background of science and education integration. *Advances in Applied Sociology, 11*(12), 618-625. https://doi.org/10.4236/aasoci.2021.1112052

[6] Chu, H. (2022). Research on a New Mode of Integration of Production and Education for Applied Undergraduates *[J].*

economic and social development, 4(16), 68-72. https://doi.org/10.25236/ijnde.2022.041613

[7] Eckhart, M., Brenner, B., Ekelhart, A., & Weippl, E. (2019). Quantitative security risk assessment for industrial control systems: Research opportunities and challenges. https://doi.org /10.22667/JISIS.2019.08.31.052

[8] Hlushenkova, A., Kalinin, O., Navrozova, Y., Navolokina, A., Shcherbyna, V., & Doroshenko, T. (2024). Management of Strategies for Shaping the Innovative and Investment Potential of Enterprises as a Factor Ensuring Their Economic Security. *Indian Journal of Information Sources and Services, 14*(3), 16-22. https://doi.org/10.51983/ijiss-2024.14.3.03

[9] Karimov, N., Turobov, S., Janzakov, A., Navotova, D., Ongarov, M., Inogamova, D., ... & Nematov, O. (2024). Exploring Food Processing in Natural Science Education: Practical Applications and Pedagogical Techniques. *Natural and Engineering Sciences, 9*(2), 359-375. https://doi.org/10.28978/nesciences.1574453

[10] Katsaliaki, K., Galetsi, P., & Kumar, S. (2022). Supply chain disruptions and resilience: A major review and future research agenda. *Annals of Operations Research,* 1-38. https://doi.org/10.1007/s10479-020-03912-1

[11] Khalikova, R., Musaeva, U., Djuraeva, N., Jumanazarov, U., Sadriddinova, F., Khujakulov, A., & Sattorova, Z. (2024). Managing Digital Transformation: Analysing Digitalization of How Firms Attract, Retain, and Develop Digital Skills. *Indian Journal of Information Sources and Services, 14*(4), 147–152. https://doi.org/10.51983/ijiss-2024.14.4.23

[12] Liao, X., Fu, Z., Huang, Z., Li, Z., Pan, Q., Qian, L., ... & Li, X. (2021). Innovation and Practice of “Four-in-One” Medical Talent Training Mode Driven by “Wisdom, Integration and Characteristics”. *Creative Education, 12*(6), 1262-1272. https://doi.org/10.4236/ce.2021.126095

[13] Moghadam, N. S., Beigi, S. S., & Ahmadzadeh, M. (2014). Examining the Impact of Research and Development Department Performance on the Profitability of Golkaran Agro-Industrial Company. *International Academic Journal of Accounting and Financial Management, 1*(1), 44–56.

[14] Rajaram, A. (2018). End-User Issues in the ICT Industry. *International Journal of communication and computer Technologies, 6*(2), 9-12.

[15] Remadevi, O. T., & Ravi Kumar, V. (2017). Engineering Students’ Communication Skills, Their Socioeconomic Backgrounds and Academic Excellence. *International Academic Journal of Business Management, 4*(1), 224–235.

[16] Song, Y., Berger, R., Rachamim, M., Johnston, A., & Colladon, A. F. (2022). Modeling the industry perspective of university-industry collaborative innovation alliances: Player behavior and stability issues. *International Journal of Engineering Business Management, 14*. https://doi.org/10.1177/18479790221097235

[17] Tseng, F. C., Huang, M. H., & Chen, D. Z. (2020). Factors of university–industry collaboration affecting university innovation performance. *The Journal of Technology Transfer, 45,* 560-577. https://doi.org/10.1007/s10961-018-9656-6

[18] Webb, M. E., Fluck, A., Magenheim, J., Malyn-Smith, J., Waters, J., Deschênes, M., & Zagami, J. (2021). Machine learning for human learners: opportunities, issues, tensions and threats. *Educational Technology Research and Development, 69*(4), 2109-2130.https://doi.org/10.1007/s11423-020-09858-2

[19] Ye, Z., Liu, S., Zhang, H., & Wu, G. (2020). Exploration and Research on the training path of Cybersecurity Application-oriented talents by the integration of industry and Education *[J]. Educ J, 9*(5), 137-141. https://doi.org/10.11648/j.edu.20200905.13