Indian Journal of Information Sources and Services
ISSN: 2231-6094 (P) Vol.15, No.1, 2025, pp.107-114

DOI: https://doi.org/10.51983/ijiss-2025.IJISS.15.1.15

Exploring the Relationship Between Teacher Job Satisfaction, Self-Efficacy, and Student Engagement in Engineering Classrooms

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(Received 19 November 2024; Revised 03 January 2025, Accepted 22 January 2025; Available online 28 March 2025)

Abstract **- Education is the light that drives out the darkness from life and directs attention toward a child's overall growth. The procedure is tripolar. It entails communication between the instructor, the students, and the community. One important person in the country's life is the teacher. Since ancient times, the function of the teacher has been seen as crucial in forming society as well as the personalities of the students. They create societies, show the way forward for the country, and preserve the human elements of life. A commonly acknowledged psychological component of working in any field is job satisfaction. Everyman in every field works to reach his goal. Student engagement in engineering classrooms is a multifaceted construct that encompasses emotional, cognitive, and behavioral dimensions, influencing students' motivation, interest, and participation in learning activities. In engineering education, effective student engagement is essential because it helps students grasp difficult ideas more deeply, develops their critical thinking and problem-solving abilities, and gets them ready for lucrative engineering professions. However, engineering classrooms often pose unique challenges to student engagement, such as high student-to-faculty ratios, complex technical material, and limited opportunities for hands-on learning, highlighting the need for innovative instructional strategies and research-based approaches to enhance student engagement and learning outcomes in engineering education. This study uses a mixed-methods approach to examine the relationship between student engagement, instructor job satisfaction, and self-efficacy in engineering classrooms. The study will investigate how teacher self-efficacy and work satisfaction affect student engagement and pinpoint the elements that affect both student outcomes and teacher wellbeing. The results of this study will influence the creation of evidence-based tactics to improve teaching and learning outcomes in engineering education by offering insightful information to educators, administrators, and legislators.**

Keywords**: Job Satisfaction, Self-Efficacy, Student Engagement, Engineering Colleges**

I. INTRODUCTION

"Engineering" is derived from the Greek word "many" and "techniques," which means "arts." An institution that provides a range of professional courses, primarily technical and vocational in character, is referred to as an engineering school (Wang & Pan, 2023). The quick industrialization and globalization have built up a domain with the expectation of complimentary stream of data and innovation through different quick and proficient means world over (Sökmen, 2021). This has prompted contracting or world, bringing individuals from various culture and condition together, offering ascend to a worldwide town. A move has been occurring in India from shut request to adapt down to difficulties of taking care of new advancements, materials and techniques, we need to give HR having fitting learning, proficient abilities and state of mind. Specialized instruction framework is one of the noteworthy parts of the human asset improvement and has become truly well amid every one of these years and now the time has come to merge and mix quality viewpoint in the conveyance framework (Zhou et al., 2024). Specialized instruction assumes and essential part in the financial improvement of the nation as a rule, liberation and strengthening of poor and distraught gatherings/ populace specifically. It gives differed kind of labor. It is spine of a nation for its foundation, modern and monetary advancement. Our expert training framework gives the mechanical building instruction to understudies in order to prep up their identities to such a level, to the point that they make a stamp not just in the development and improvement of our own nation additionally make an astounding and positive mark in created learning economies of the world (Preechawong et al., 2024). The Engineering instruction takes into account the need of industry/govt. offices/open divisions endeavors/barrier/railroads and every single other business by giving talented professionals, administrators and center level specialized prepared labor. In the coming years there is setting off to the more prominent interest for talented labor, the administration part as well as in the center assembling industry. Indian Technicians have effectively shown their value internationally. Actually, engineering offers the convenience of multiple career courses at one location. Engineering courses assist people launch their careers by enabling them to create their own businesses or land a respectable job at a reputable company. The range of subjects taught in these engineering programs is endless and

includes architecture, computer engineering, mechanical engineering, chemical engineering, information technology, and fashion design (Crawford et al., 2021). The Engineering colleges have Professors, Associate Professors, HODs and Assistant Professors in teaching staff. They should be paid the salary as per guidelines of AICTE and affiliating university and UGC norms. The government Engineering college teaching staff is getting the salary as per norms of AICTE, Affiliating university and UGC but the private Engineering colleges are paying the salary to the teaching staff as per norms. Therefore, research on the male and female Private Engineering college lecturers of Ernakulam District regarding the frustrations while doing their job (Jang et al., 2023).

Through the introduction of Teacher Job Satisfaction, Self-Efficacy, and Student Engagement in Engineering Classrooms, as well as the identification, analysis, and discussion of the primary connections between Ernakulam City's engineering classrooms and their professors, this study helps to bring clarity. The contribution of the proposed work is,

- To assess the degree of correlation between engineering college students' academic success and teachers' job satisfaction.
- To assess the degree of correlation between engineering college students' academic performance and the leadership style of their principals (Prabahar et al., 2024).
- To examine how work engagement and inventive behaviour affect job success.
- To investigate the ways in which teacher job satisfaction, self-efficacy, and student engagement impact work performance; additionally, to examine the connection between teachers' mental health and professional engagement (Sökmen, 2021).

Hypothesis

- There is a significant positive link between engineering college students' academic achievement and teachers' work happiness.
- Student engagement in engineering classrooms and teachers' job satisfaction are significantly positively correlated.

The article's remainder is organized as follows. First, the literature on self-efficacy is reviewed, and the theoretical theories that go along with it are proposed. Second, the techniques and findings are proposed in this paper. We wrap up by talking about our findings, their theoretical and practical ramifications, and potential avenues for further study. Lastly, we provide a study conclusion.

II. Literature Review

The degree to which a person believes they are capable of performing the duties required for a particular career or vocational endeavour is known as occupational self-efficacy. The concept of self-efficacy was initially articulated (Yoon & Kim, 2022) thirty years ago. In the study of human social cognition theories, the idea of self-efficacy evolved. In his initial studies, Bandura concentrated on the "extraordinary symbolizing capacity of human beings." According to theory, people use these symbolic talents to comprehend their surroundings through intentional behaviour, solve issues intellectually, cultivate introspective ideas, and interact with others in an efficient manner. People's lives gain structure, purpose, and continuity when they use symbols to represent their experiences. The ability to be self-directed and to have foresight—that is, to plan a path of action and set challenges and goals that lead their future activities—is another characteristic that sets social cognitive theory apart and is a key component of this theory. It is claimed that once we establish a personal standard, the positive and negative effects of those standards govern our motivation for behaviour and subsequent activities. We all take part in activities that give us a sense of fulfilment and self-worth, and we avoid doing things that make us feel less valuable (Abun et al., 2022). Since self-efficacy dictates what people will do with their knowledge and skills, behaviour can be anticipated by predicting perceived self-efficacy—a person's views about their capabilities—over actual accomplishments. Because of the significance of perceived self-efficacy, behavior might occasionally deviate significantly from real capabilities. While some people are quite sure in what they can do despite their credentials and limited talents, gifted people may have significant self-doubt even when they are very capable of performing and exceeding the work entrusted to them (Cong et al., 2024). Regarding thoughts about self-efficacy and self-concept (or self-esteem), there is a lot of misunderstanding. However, the two constructs stand for completely different self-beliefs that denote very different concepts. Beliefs about one's own talents, or assessments of one's capacity to carry out specific tasks, are the focus of self-efficacy. Stated differently, self-efficacy is a context-specific evaluation of one's ability to carry out a particular action or a variety of tasks within a particular area (Ismayilova & Klassen, 2019). One's beliefs about one's abilities and dislikes of oneself are not inextricably linked. For example, a student may feel very ambitious in his academic endeavors but lack the positive feelings of self-worth that go along with it, partly because he may not take pride in his achievements in this area. In a similar vein, proficient bomber pilots during times of war may not take pride in their professional abilities, but they do have strong efficacy beliefs about them. The difference between the two conceptions, according to the author in (Kalkan, 2020), is a difference in the source of a person's judgment. They claimed that social and self-comparisons—which they referred to as "frame of reference effects"—are the foundation of self-concept judgments. People assess their own value by comparing themselves to others and to themselves.

Problem Statement

Teacher-related factors like burnout, which is brought on by high levels of stress, a lack of autonomy, and insufficient support, as well as opportunities for professional development, training, and mentoring that can boost self-efficacy and job satisfaction, are just a few of the factors that affect teacher job satisfaction and student engagement (Masoumeh et al., 2013). Student-related factors, including intrinsic motivation and interest in engineering, classroom diversity, and regular student feedback, also play a crucial role (Al Hasni, 2017). Student involvement can also be impacted by instructional elements like well-designed curricula, cutting-edge teaching techniques like project-based learning and gamification, and assessment techniques that offer frequent, helpful feedback and genuine assessments. Furthermore, institutional-related factors, including a supportive school culture that values teacher well-being, student engagement, and academic achievement, strong administrative support, and parental involvement, can positively influence teacher job satisfaction and student engagement (Gorondutse & John, 2018; Wang, 2022).

Research indicates that teacher job satisfaction and self-efficacy have a considerable impact on student engagement and academic achievement, notwithstanding the crucial role teachers play in determining students' learning experiences (Mohammed et al., 2024). However, the interplay between these factors remains poorly understood, particularly in engineering education. This knowledge gap hinders the development of effective strategies to promote teacher well-being, enhance instructional quality, and foster student engagement in engineering classrooms, ultimately threatening the long-term success and diversity of the engineering workforce (Abbaspoor et al., 2014). The empirical data on how teacher job satisfaction, self-efficacy, work affect student engagement in engineering classrooms are currently contradictory (Liu et al., 2023; Huang et al., 2020). There is a need for a social and relational work design perspective on this notwithstanding efforts by some to address it (Anning, 2024). In the developed world, a lot of research has been done on the psychological contract, employee engagement, and job stress. However, the majority of the studies have focused on the following topics: the causes and effects of job stress and employee engagement, the impact of relational and transactional psychological contracts on employee engagement, and psychological contract breach and fulfilment (Chan et al., 2020). Numerous researches have been done on creating employ engagement and psychological wellbeing in different states and districts. But these studies do not cover the Kerala states. Consequently, the goal of this study is to assess the existing degree of employee engagement and its effect on psychological health in order to make recommendations for overcoming organizational ineffectiveness in Ernakulum City through employee engagement and psychological wellbeing.

III. METHODOLOGY

The success of engineering education institutions relies heavily on effective academic leadership, which plays a pivotal role in fostering a conducive organizational climate that promotes teacher job satisfaction and student academic achievement. As institutions grow in size and complexity, principals face increasing challenges in managing and inspiring their staff to work collaboratively towards institutional goals. The literature on the relationship between teacher job satisfaction, self-efficacy, and student engagement in engineering classrooms is limited and fragmented, despite the importance of this issue. This underscores the need for a thorough investigation to examine these intricate dynamics and guide evidence-based strategies for improving teaching and learning outcomes in engineering education. The researcher went through different literature available and found that no research of this type done previously. Thus, the current endeavour is to investigate the academic performance of Engineering College students in connection with the job happiness of teachers and the leadership style of heads in Kerala State.

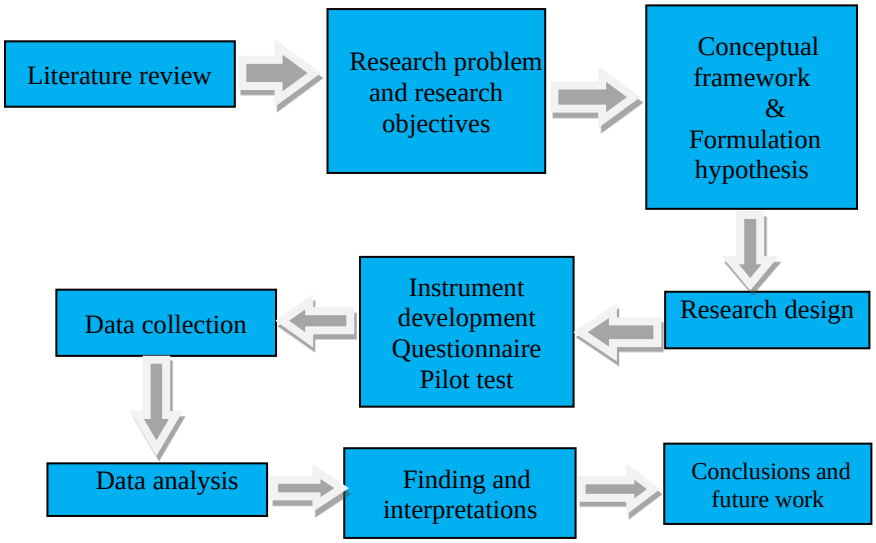

Fig. 1 Research Schema

In fig. 1 displays the research schema above. An approach for systematically resolving the research issue at hand is called research methodology. It combines research techniques and the reasoning behind such techniques. The following methodology was used to carry out the goals of this research. The primary objective of this study is to determine the relationship between effective employee engagement and employee well-being. The effects of supportive leadership, rewards and recognitions, and career advancement opportunities on teacher engagement has also been investigated, along with the interaction between the various demographic variables. It has also been demonstrated that employee retention is (Perevozkina et al., 2021) influenced by how they perceive their jobs.

The present study relies on upon the 'Realistic Survey Method.' Descriptive research studies are proposed to get correct information concerning the back-and-forth movement status of ponder and to achieve generous general conclusions from the substances discovered.' Descriptive surveys are something past a collection of data; they incorporate estimation, gathering, examination, examination and comprehension. Descriptive research depicts what it is incorporates the delineation recording examination and comprehension of conditions that exists; it incorporates a couple of helpers as examination or unpredictability and attempt to discover association between existing non controlled elements (Fong et al., 2019). This realistic research is stressed with the present and attempt to choose the status of the wonder under investigation Its methodology incorporate delineations, recording, separating and interpreting conditions that sort do associates or contras contracts and may attempt to discover conditions and final products relationship.

3.1. Research Location and Rationale

In addition to its rich cultural heritage, Ernakulam, which is surrounded by the districts of Thrissur to the north, Idukki to the east, Alappuzha and Kottayam to the south, and the Lakshadweep Sea to the west, has also seen the growth of international trade. The Ernakulam urban district was chosen by the researcher to conduct the current survey. The densely populated district of Ernakulam was chosen because it reflects the accomplishments of the Kerala State in the areas of industry, trade, commerce, and literacy. Ernakulam embodies Kerala's high modern phase with its inclusive culture, comparatively high per capita income, and people's unwavering desire to stay informed about political, economic, social, and cultural events both domestically and internationally.

3.2. Data Collection and Sampling

The study was carried out in Kerela, Ernakulam. Many engineering college teachers and higher authorities were given the questionnaire (Table I). Sampling is the systematic procedure of selecting the cluster, which represents the characteristics of a population. After finalizing the elements of research design, the characteristics of the targeted sample were identified. Sample represents a set of persons who take part in the survey. The people who take part are referred to as "participants". In research, sample is the section of the population which is cautiously chosen and it demonstrates the characteristics as well as distribution of the entire populace. Sampling techniques aim to identify and choose those individuals who are suitable for the research. Any sample should get a good representation of a large population by providing valuable information. Sampling techniques have been broadly divided into non-probability and probability sampling techniques. In probability techniques, each member has the same chance of selection from the population. Simple random sampling, stratified, cluster, and systematic sampling are examples of probability approaches. Among the non-probability methods are ethnography, quota, and selective sampling.

TABLE I PARTICIPANT'S OVERVIEW

Participant	Gender	Age	Occupation	Employment Industry
1	Male	39	Professors	Academic
2	Male	32	Associate Professors	Academic
3	Female	37	Assistant Professors	Academic
4	Female	28	Lecturers	Academic
5	Female	33	Senior Lecturers	Academic
6	Female	27	Adjunct Faculty	Academic
7	Male	29	Visiting Faculty	Academic
8	Male	33	Research Scholars	Academic

Teachers' Engagement

The level of employee engagement was assessed using an engagement scale. There are five categories or levels of employee involvement are explained below (table II):

TABLE II ENGAGEMENT SCALE

Stages of engagement	Range
Actively disengaged	0-10
disengaged	11-20
Opportunistic	21-30
Engaged	31-40
Actively Engaged	41-50

Self-efficacy and job happiness are closely related because people who have high self-efficacy—the belief that they are capable and effective in their roles—tend to have higher levels of job satisfaction. Employees are more likely to feel inspired, self-assured, and fulfilled when they have faith in their capacity to complete tasks and reach objectives, which increases job satisfaction. Conversely, job satisfaction can also enhance self-efficacy, as a positive work environment and supportive colleagues can foster a sense of competence and confidence, creating a reciprocal connection between

self-efficacy and job satisfaction (table III). The reviews of experienced and inexperienced teachers are plotted.

TABLE III JOB SATISFACTION REVIEWS

characteristics	New workers	Experienced workers
Overall satisfaction with working arrangement	23%	10%
Productivity at work	31%	13%
Sence of belonging at work	45%	25%

Reliability

The reliability of the questionnaire is usually assessed using the Cronbach alpha value for each statement. All of the latent variables' Cronbach's alpha values are shown in Table IV and are greater than the recommended threshold of 0.70.

TABLE IV RELIABILITY SCALE

Construct	Cronbach's alpha
Teacher-Related Factors	**0.83**
Teacher Burnout	0.84
Professional Growth	0.76
Student Relationships	0.78
Workplace isolation	0.78
Student-Related Factors	**0.81**
Intrinsic Motivation:	0.82
Classroom Diversity	0.81
Student Feedback	0.80
Curriculum Design	0.83
Assessment Strategies	0.81
Innovative Teaching Methods	0.84
Involvement	0.76
Work engagement	**0.73**
Working conditions	0.78
Supportive School Culture	0.75
Administrative Support	0.79
Carrier development	0.74
Work-life balance	0.75
Psychological Well-Being	**0.79**
Environmental Mastery	0.70
Self-acceptance	0.72
Purpose of Life	0.73
Autonomy	0.74
Personal Growth	0.73
Positive relations	0.79
Total items	***0.85 (Overall)***

According to the predictors—fairness in promotions, working hours, pay and benefits, training and development, job security, and workplace resources—Table V shows the overall analysis of several sectors under the dependent variable, job satisfaction (Preechawong et al., 2024). From that, each sector is been categorized as satisfied and dissatisfied under various measures. From the below table, the Sig value which is equal to or greater than 0.05 is occurred for the college sector, the difference between satisfied and dissatisfied individuals shows significant compared to the value which is less than 0.05.

TABLE V OVERALL ANALYSIS UNDER JOB SATISFACTION

Description	Groups based on satisfaction	Mean	Std deviation	Mean diff	T value	Sig
Teaching style	Satisfied	29.6	5.8	1.37	1.62	0.05
	Dissatisfied	28.1	4.9			
Teacher-student interaction	Satisfied	31.7	4.4	1.7	1.48	0.04
	Dissatisfied	34.2	5.1			
Teacher enthusiasm	Satisfied	20.6	3.8	1.42	1.9	0.02
	Dissatisfied	23.5	4.4			
Teacher expectations	Satisfied	33.1	5.9	1.93	2	0.04
	Dissatisfied	29.5	4.9			

(source: Prepared by author)

The total beta values, which indicate each predictor's contribution to the model, are displayed in Table VI. The table below makes it clear that the elements that have the biggest impact on job satisfaction are pay and benefits, workplace resources, opportunities for training and development, and equity in promotions.

TABLE VI BETA-COEFFICIENT ANALYSIS

Sectors	Factors	Coefficient B	Std error	Beta	T value	Sig
Teaching style	Job security	0.44	0.038	0.06	1.56	.03
	Compensation	0.32	0.048	0.052	3.78	.01
	Working hours	0.01	0.051	0.02	0.062	.05
	Resources	0.36	0.035	0.347	2.76	0.00
	Dev opportunity	0.39	0.033	0.148	3.9	0.02
	Promotion fairness	0.25	0.059	0.368	3.37	0.01
Teacher-student interaction	Job security	0.5	0.031	0.032	2.5	.037
	Compensation	0.31	0.013	0.028	3.3	.035
	Working hours	0.41	0.02	0.17	0.02	0.015
	Resources	0.32	0.04	0.228	4.21	0.03
	Dev opportunity	0.4	0.014	0.412	4.84	0.027
	Promotion fairness	0.37	0.033	0.377	4.1	0.011
Teacher enthusiasm	Job security	0.2	0.020	0.012	1.5	.013
	Compensation	0.21	0.016	0.025	2.3	.041

	Working hours	0.33	0.02	0.11	0.06	0.02
	Resources	0.48	0.031	0.201	3.8	0.00
	Dev opportunity	0.43	0.018	0.325	3.01	0.022
	Promotion fairness	0.22	0.037	0.355	3.9	0.01
Teacher expectations	Job security	0.36	0.038	0.021	2.1	.03
	Compensation	0.3	0.02	0.052	2.6	.023
	Working hours	0.24	0.039	0.26	0.08	0.027
	Resources	0.51	0.032	0.24	3.7	0.02
	Dev opportunity	0.47	0.02	0.45	4.81	0.038
	Promotion fairness	0.33	0.04	0.219	4.01	0.035

(source: Prepared by author)

Descriptive statistics of performance evaluation by job satisfaction level are displayed in Table VII. According to the table below, the work's variable quality, the Mean obtained from satisfied people is 6.61% and for dissatisfied individuals is 5.3% and the SD obtained is 1.52, for the variable knowledge of the job, the mean value of satisfied individuals is 6.8% and 5.2% for dissatisfied individuals and the overall SD obtained is 1.34, for variable productivity, the mean obtained by satisfied are 20.5% and 16.8% for dissatisfied individuals in which overall SD value obtained is 3.5.

TABLE VII PERFORMANCE VALUATION OVER STUDENT-RELATED FACTORS COEFFICIENT

Variables	Groups	Mean	SD
Prior knowledge and experience	Satisfied	6.61	1.65
	Dissatisfied	5.3	1.47
Motivation and interest	Satisfied	6.8	1.36
	Dissatisfied	5.2	1.4
Learning style	Satisfied	20.5	3.52
	Dissatisfied	16.8	4.26
Self-efficacy and confidence	Satisfied	11.2	1.7
	Dissatisfied	7.9	2.12
Relevance and authenticity	Satisfied	12.1	1.5
	Dissatisfied	7.3	2.8
Hands-on activities	Satisfied	15.93	2.8
	Dissatisfied	13.2	2.5
Interdisciplinary connections	Satisfied	20.16	3.6
	Dissatisfied	17.35	4.28

(source: Prepared by author)

IV. ANALYSIS AND RESULTS

The data was arranged and examined after it had been gathered. With the computer programme Statistical Package for Social Sciences (SPSS), descriptive statistics were used in the first phase to determine the respondents' psychological contract type, level of engagement, and level of stress All three variables' mean values were calculated. The type of psychological contract that was determined in the first phase's analysis was used to identify its impact on employee engagement in the second phase's simple linear regression analysis. To do this, the mean or average value for both variables has been calculated. In the third phase, the SOBEL test was used to ascertain if stress mediates the relationship between the psychological contract and employee engagement (EE). The mean value of the variables was used to do this. All independent factors and the associated subscales under self-efficacy, job engagement, and job satisfaction are statistically significant and have an effect on an engineering teacher, according to the SPSS test findings (Table VIII).

H1: There exists significance positive correlation between teacher ‘s job satisfaction and academic achievement of engineering college students.

TABLE VIII SPSS TEST MODEL

Construct		Value	F	Hypothes is df	Error df	Sig.	Partial Eta Square d
Teacher-Related Factors	Teacher Burnout	0.155	87.016[b]	**6**	728.000	**0**	0.418
	Teacher Burnout	0.845	87.016[b]	**6**	728.000	**0**	0.418
	Professional Growth	0.184	87.016[b]	**6**	728.000	**0**	0.418
	Student Relationships	0.184	87.016[b]	**6**	728.000	**0**	0.418
Student-Related Factors	Intrinsic Motivation:	0.235	30.174[b]	**6**	728.000	**0**	0.199
	Classroom Diversity	0.765	30.174[b]	**6**	728.000	**0**	0.199
	Student Feedback	0.308	30.174[b]	**6**	728.000	**0**	0.199
	Curriculum Design	0.308	30.174[b]	**6**	728.000	**0**	0.199
Work engagement	Working conditions	0.218	20.294[b]	**6**	728.000	**0**	0.143
	Supportive School Culture	0.782	20.294[b]	**6**	728.000	**0**	0.143
	Administrative Support	0.279	20.294[b]	**6**	728.000	**0**	0.143
	Carrier development	0.279	20.294[b]	**6**	728.000	**0**	0.143
Workplace isolation	Student Feedback	0.281	27.253[b]	**6**	728.000	**0**	0.183
	Parental Involvement	0.719	27.253[b]	**6**	728.000	**0**	0.183
	Administrative Support	0.391	27.253[b]	**6**	728.000	**0**	0.183
	Supportive college Culture	0.391	27.253[b]	**6**	728.000	**0**	0.183

Examining the relationship between student engagement, self-efficacy, and teacher job satisfaction in engineering classrooms, statistically significant relationships were found. In particular, self-efficacy elements, such as classroom management and instructional tactics, had an impact on teachers' job satisfaction. In turn, job satisfaction elements like administrative support and autonomy had an impact on teacher self-efficacy. Both teacher job satisfaction and self-efficacy had an impact on student engagement, which includes behavioural, cognitive, and emotional aspects. The results demonstrate how these factors are interrelated and stress the necessity for administrators and teachers to address teacher self-efficacy and work satisfaction in order to create a more stimulating learning environment for engineering students (Table IX).

H2: There exists significance positive correlation between teacher ‘s job satisfaction and Student Engagement in Engineering Classrooms.

TABLE IX MEASUREMENT MODEL FOR SOBEL

Construct	Value	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Square d
Teacher-Related Factors	Teacher Burnout	89.746[a]	22	1.958	0.111	0.111	0.111
	Teacher Burnout	302.501[b]	22	8.942	0.900	0.900	0.900
	Professional Growth	43.072[c]	22	6.257	3.552	3.552	3.552
	Student Relationships	196.727[d]	22	3.531	0.072	0.072	0.072
Student-Related Factors	Intrinsic Motivation:	137.648[e]	22	11.025	0.029	0.029	0.029
	Classroom Diversity	77.687[f]	22	5.905	2.208	2.208	2.208
	Student Feedback	11.025	1	7.945	9.867	9.867	9.867
	Curriculum Design	5.905	1	36.235	0.001	0.001	0.001
Work engagement	Working conditions	7.945	1	0.003	3.517	3.517	3.517
	Supportive School Culture	36.235	1	9.178	2.048	2.048	2.048
	Administrative Support	0.021	1	2.038	1.273	1.273	1.273
	Carrier development	0.012	1	0.021	0.227	0.227	0.227
Workplace isolation	Student Feedback	7.489	1	0.012	1.995	1.995	1.995
	Parental Involvement	0.360	1	7.489	0.104	0.104	0.104
	Administrative Support	0.752	1	0.360	1.457	1.457	1.457
	Supportive college Culture	0.922	1	0.752	7.982	7.982	7.982

The most valuable resource for educational institutions is their teaching workforce, and motivated, skilled, and devoted educators are essential for providing a competitive edge in engineering education. Committed teachers who go above and beyond their contractual obligations are crucial for achieving organizational goals and fostering a supportive learning environment. Given that these elements are separate but related facets of teacher commitment, the purpose of this study is to investigate the complex links among teacher job satisfaction, self-efficacy, and student involvement in engineering classes. Through examining the intricate relationships among these variables, this study aims to provide light on the elements that affect student engagement, teacher job satisfaction, and self-efficacy, ultimately guiding the development of solutions to improve the caliber of engineering education.

V. CONCLUSIONS

By looking at elements including teacher-student interactions, instructional methodologies, classroom atmosphere, and institutional support, this study seeks to understand the intricate relationship between teacher job satisfaction, self-efficacy, and student engagement in engineering classes. The study will also look at how professional development, teaching experience, and teacher demographics affect self-efficacy and work happiness. Additionally, the study will examine how student characteristics like motivation, interest, and past knowledge affect engagement. Furthermore, in order to uncover potential mediators and moderators, the study will investigate the connections among teacher job satisfaction, self-efficacy, and student involvement. The results of the study will help educators, administrators, and legislators develop strategies to improve engineering education's teaching and learning outcomes.

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