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Team Temporal Leadership and its impact on Retention of Admissions – An Empirical Evidence from the select Higher Education institutions

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Abstract:

The decline in engineering admissions in India has raised significant concerns regarding the future of technical education in the country. Despite the historical emphasis on engineering as a primary career path, the steady reduction in enrolment poses challenges to both the educational system and the workforce. This study explores the role of temporal leadership in addressing this decline and improving student retention in engineering programs. Temporal leadership, characterized by effective time management, curriculum responsiveness, proactive student engagement, and timely industry collaboration, is proposed as a crucial strategy for aligning academic institutions with evolving industry needs. The study identifies key variables such as real-time feedback mechanisms, academic scheduling, and resource allocation, which can enhance student satisfaction and engagement. Furthermore, it highlights the potential of temporal leadership in addressing regional disparities and institutional variations. Given the rapid pace of technological advancements and shifting student preferences, a more responsive and adaptive approach to higher education leadership is essential. This research aims to fill gaps in existing literature by offering actionable insights into the integration of temporal leadership strategies for enhancing student retention and ensuring the relevance of engineering education in India.

Key Words:-Indian Higher Education Sector, Temporal Leadership, Student Retention, Real-Time Feedback Mechanisms, Proactive Engagement Initiatives, Resource Allocation Timeliness

Introduction:

The Indian higher education system has undergone significant reforms in the recent ear, focusing on accessibility, quality enhancement, and global competitiveness. A cornerstone of this transformation is the National Education Policy (NEP) 2020, which emphasizes a multidisciplinary approach, equitable access, and fostering research and innovation (Kumar, 2021). The policy targets increasing the Gross Enrolment Ratio (GER) to 50% by 2035 while proposing the creation of the Higher Education Commission of India (HECI) to consolidate regulatory oversight, excluding medical and legal education (Rao, 2022). These reforms reflect India's aspiration to strengthen its position in the global education ecosystem.

Aligned with the NEP, various initiatives such as the Education Quality Upgradation and Inclusion Programme (EQUIP) and the Revitalising Infrastructure and Systems in Education (RISE) were launched. EQUIP aims to double GER and position Indian universities among the top 1,000 globally by enhancing academic quality and infrastructure (MHRD, 2020). Similarly, RISE, with funding facilitated through the Higher Education Financing Agency (HEFA), aimed to raise ₹1,00,000 crore by 2022 to modernize educational infrastructure (Pandey & Sharma, 2021). These efforts showcase India's commitment to fostering a robust and inclusive higher education landscape.

Admissions criteria in Higher Education:

The Indian engineering education landscape experienced significant changes in admission processes and seat availability. In 2015, a joint seat allocation process was introduced for undergraduate admissions across over 500 programs in 80 technical universities, including the prestigious Indian Institutes of Technology (IITs). This system, based on the Deferred Acceptance algorithm, aimed to streamline admissions and reduce vacancies. Notably, the IITs saw a 70% reduction in vacant seats following its implementation (Kapoor & Sharma, 2019).

In the subsequent years, the number of applicants for engineering entrance examinations demonstrated varying trends. The Joint Entrance Examination (JEE) – Main, the primary gateway for engineering aspirants, saw approximately 1.3 million candidates register in 2015. This number declined slightly over the following years, with 1.19 million registrations in 2016 and 1.18 million in 2017. However, by 2024, interest had resurged, with around 1.22 million candidates registering (AICTE, 2024). This resurgence can be attributed to enhanced outreach and the increasing availability of government scholarships.

Seat availability in engineering programs also witnessed notable growth. According to the All India Council for Technical Education (AICTE), the approved intake for undergraduate engineering and technology programs in 2024-25 reached 1.49 million. This represented an 18.84% increase compared to 2021-22, marking an eight-year high. The increase reflects a recovery in demand for engineering education, coupled with AICTE's initiatives to enhance institutional capacities (AICTE Annual Report, 2024).

These developments underscore the dynamic nature of engineering admissions in India, shaped by policy reforms, changing student preferences, and efforts to improve access to technical education. From the streamlined joint seat allocation system in 2015 to the significant seat expansions in 2024, these years' highlight India's commitment to fostering a robust engineering education ecosystem (Rao, 2023).

Decline of Admissions in to Engineering Institutions:

Between 2015 and 2024, engineering admissions in India have shown a marked decline due to multiple factors, including changing student preferences, oversaturation of engineering seats, and concerns over employability. In 2015, India had over 1.6 million approved undergraduate engineering seats, but only about 60% were filled, leaving approximately 40% vacant. This trend continued as students began to explore alternative fields of study, such as management, data science, and the arts, which were perceived to offer better career prospects (Ramesh & Varma, 2017).

The decline became more pronounced in the years following 2016, as the employability of engineering graduates came under scrutiny. According to a study by Aspiring Minds (2019), only 20% of Indian engineering graduates were employable in roles requiring core technical skills. This perception of poor job readiness discouraged students from pursuing engineering degrees, leading to a steady drop in applications. By 2018, many private engineering colleges reported seat vacancy rates as high as 50% (MHRD, 2018).

The situation worsened during the COVID-19 pandemic (2020-2022), which disrupted education and reduced the willingness of students to enroll in engineering programs due to uncertainties in job markets and economic conditions. According to AICTE data, engineering seat occupancy fell to an all-time low in 2021, with only 54% of the available seats being filled. Additionally, many engineering colleges were forced to shut down due to financial non-viability, further reducing options for prospective students (AICTE Annual Report, 2022).

Despite efforts by policymakers and institutions to reverse the trend through initiatives like fee subsidies, curriculum modernization, and increased industry collaborations, admissions into engineering programs continued to struggle. By 2024, even with an uptick in overall education enrollments due to NEP 2020, the engineering sector lagged behind other disciplines. Experts have suggested that without a significant overhaul of the engineering education framework and greater alignment with industry needs, the decline is likely to persist (Sharma & Iyer, 2024).

Temporal Leadership and student retention in Higher Education sector:

The concept of temporal leadership, which emphasizes time management, coordination, and the timely implementation of strategies, is highly relevant to addressing the challenges of retaining students in higher education, particularly in engineering programs. Temporal leadership focuses on aligning institutional goals with students' aspirations by managing academic schedules, ensuring timely curriculum updates, and adapting to industry demands (Wang et al., 2019). In the context of declining engineering admissions in India, temporal leadership can play a pivotal role in retaining students by fostering a responsive educational environment that aligns with contemporary trends and technological advancements (Singh & Mehta, 2021).

The application of temporal leadership in higher education could involve actions such as the timely integration of emerging fields like artificial intelligence, data science, and renewable energy into existing curricula. Furthermore, temporal leadership facilitates proactive engagement with students through periodic academic reviews, career counseling, and real-time feedback mechanisms. Research indicates that institutions employing such leadership strategies have been more successful in reducing dropout rates and ensuring student satisfaction (Kumar et al., 2022). Given the dynamic challenges faced by Indian engineering institutions, including declining interest and employability concerns, temporal leadership is not just a complementary strategy but a necessary framework for retaining students and preparing them for future opportunities.

Variables of Temporal Leadership with respect to Higher Education Sector:

Real-Time Feedback Mechanisms

Systems that allow for continuous evaluation and adaptation based on student inputs. Student satisfaction surveys, immediate feedback on teaching methods, and addressing grievances promptly (Kumar et al., 2022).

Proactive Engagement Initiatives

Activities aimed at retaining students by addressing academic, emotional, and career needs in a timely manner. Career counseling sessions, mentoring programs, and timely workshops on employability skills (Ramesh & Varma, 2017).

Resource Allocation Timeliness

Ensuring timely availability of academic and non-academic resources for students. Distribution of textbooks, availability of lab equipment, and addressing infrastructural challenges (Kumar et al., 2022).

Need for the Study:

The steady decline in engineering admissions in India underscores a critical issue in the nation's higher education system, with far-reaching implications for the economy and workforce development. Despite the country's historical emphasis on engineering as a cornerstone of its technical and industrial advancement, the decreasing interest in this field reflects broader systemic challenges such as oversaturation of institutions, diminishing employability of graduates, and evolving student preferences (Ramesh & Varma, 2017; Aspiring Minds, 2019). A thorough investigation into these factors is crucial for identifying the root causes of the decline and assessing the effectiveness of current policies, such as the National Education Policy (NEP) 2020, in addressing these challenges (Sharma & Iyer, 2024). Research in this area is vital for guiding policymakers and educators toward actionable solutions that ensure the relevance and competitiveness of engineering education in India.

The need for this study is also evident in its potential to provide insights into how India can align its engineering education with the demands of Industry 4.0 and emerging global technological trends. With only 20% of engineering graduates deemed employable for technical roles (Aspiring Minds, 2019), there is an urgent need to explore innovative pedagogical approaches, industry-academia partnerships, and curriculum reforms that can enhance skill alignment and job readiness. Furthermore, the closure of many engineering institutions due to poor admissions rates poses a challenge to equitable access to technical education, particularly in underserved regions (AICTE, 2022). This research aims to provide evidence-based recommendations to revitalize engineering education, ensuring its sustainability and contribution to India's broader socio-economic goals.

Research Gap:

Although temporal leadership has been extensively studied in organizational contexts, its application within higher education, particularly in addressing the challenges of student retention in engineering programs, remains underexplored. Existing research emphasizes the importance of time-based strategies for improving team performance and coordination in corporate settings (Wang et al., 2019). However, limited studies investigate how temporal leadership can address the specific issues in Indian higher education, such as declining engineering admissions, student disengagement, and mismatches between curriculum delivery and industry needs (Singh & Mehta, 2021). This gap highlights the need for

empirical studies focusing on how temporal leadership practices can improve academic satisfaction, engagement, and retention among engineering students.

Another unexplored dimension is the potential of temporal leadership to address regional and institutional disparities in retention rates. While studies like Kumar et al. (2022) identify a positive correlation between time-oriented leadership and academic outcomes, they do not differentiate between public and private institutions or account for variations across urban and rural settings. Additionally, the role of temporal leadership in integrating industry-relevant skills into the curriculum on time, thereby reducing dropout rates due to perceived irrelevance, has not been adequately studied. Addressing these gaps can provide actionable insights into creating adaptive, student-focused policies and practices, ensuring that Indian engineering education remains competitive and responsive to global trends.

Hypotheses Formulation:

Based on the proposed research gap the researcher formulated three hypotheses to attain the objectives of the study. The detailed hypotheses are as follows:

$H1_0$: Time management competence will not have significant effect on student retention

$H2_0$: Real time feedback mechanism will not have significant effect on student retention

$H3_0$: Proactive engagement initiatives will not have significant effect on student retention

Research Methodology:

The required for the study is collected from different affiliated and autonomous engineering colleges located in the state of Andhra Pradesh. By using Cluster Sampling with a structured questionnaire the data has been collected. The researcher applied simple linear regression analysis to test the proposed hypotheses.

Data Analysis:

$H1_0$: Time management competence will not have significant effect on student retention

Using simple linear regression analysis (SLRA), the relationship between time management competence and student retention is examined. The mean scores of the dependent variable, student retention, are regresseduponthemeans of the independent variable, time management competence, in order to achieve these results. Both the coefficient summary and the regression model summaries were provided by the statistical results.

Table - 1 presents the summary of the regression model for the suggested variables. The findings demonstrated the predictor variable's substantial contribution and its strong influence on student retention. The model's R2 value was 50.9, its F-value was 882.387, and its p-value was 0.000, according to the results.

Table – 1: Regression Model Summaries for the Time management competence on Student retention

	R	R Square	AdjusteRS quare	Std.Errors of the Estimate	ANOVA Results			
					F-Value	df 1	df2	Sig.
1	0.713[a]	0.509	0.508	0.63045	882.387	1	899	0.000
a.Predictors:(Constant), Time management competence								

The following Table - 2 displays the predictor effects as well as the beta estimates, or the summary results of the coefficients. The results show that the β value is 0.676, the standard error is 0.023, the t-value is 29.705, and thep-valueis0.000. Based on this data, we deduce that the dependent variable in the suggested hypothesis is consistent with the predictor variable. Accordingly, the researcher declared that the alternative hypothesis (H1) is accepted and the suggested null hypothesis is rejected. The regression equation for the relevant hypothesis is as follows:

Student retention (Y) = 0.218+ 0.676 (Time management competence) X

Table - 2: Predictor effects and Beta Estimates (Unstandardized) for Student retention Associated with Time management competence.

Model	Variable	Unstandardized Coefficients		Standardized Coefficients	t-Value	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.218	0.132	-	1.657	0.098
	Time management competence	0.676	0.023	0.713	29.705	0.000
a. Dependent Variable: Student retention						

$H2_0$: Real time feedback mechanism will not have significant effect on student retention

The investigation of the link between student retention and real time feedback mechanism is done using simple linear regression analysis (SLRA). These findings are obtained by regressing the mean scores of the independent variable, real time feedback mechanism, on the mean scores of the dependent variable, student retention. The regression model and coefficient summaries were both provided by the statistical results.

Table - 3 below displays the regression model summary for the suggested variables. Based on the results, it was determined that the predictor variable has a considerable impact on student retention. The findings showed that the model's R2 value was 41.0, its F-value was 591.621, and its p-value was 0.000.

Table - 3 Regression Model Summaries for the Real time feedback mechanism on Student retention

Model	R	R Square	Adjusted R Square	Std.Errors of the Estimate	ANOVA Results			
					F-Value	df1	df2	Sig.
1	0.640[a]	0.410	0.409	0.69103	591.621	1	899	0.000
a.Predictors:(Constant), Real time feedback mechanism								

The following Table - 4 displays the predictor effects and the beta estimates, or the summary results of the coefficients. The results indicate that the β value is 0.811, the standard error is 0.033, the t-value is 24.323, and thep-valueis0.000. Based on this information, we deduce that the dependent variable in the proposed hypothesis is consistent with the predictor variable. Thus, the researcher declared that the alternative hypothesis (H2) is accepted and the suggested null hypothesis is rejected. The regression equation pertaining to the relevant hypothesis is as follows:

Student retention (Y) = 0.801+ 0.811 (Real time feedback mechanism) X

Table - 4: Predictor effects and Beta Estimates (Unstandardized) for Student retention Associated with the Real time feedback mechanism.

Model	Variable	Unstandardized Coefficients		Standardized Coefficients	t-Value	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.801	0.137	-	5.851	0.000

	Real time feedback mechanism	0.811	0.033	0.640	24.32	0.000
a. Dependent Variable: Student retention						

$H3_0$: Proactive engagement initiatives will not have significant effect on student retention

Using simple linear regression analysis (SLRA), the association between risk student retention and proactive engagement initiatives is examined. In order to achieve these outcomes, the mean scores of the dependent variable student retention are regressed against the means of the independent variable, proactive engagement initiatives. Both the coefficient summary and the regression model summaries were provided by the statistical results.

Table - 5 below displays the regression model summary for the suggested variables. The findings demonstrated the predictor variable's substantial contribution and its strong influence on student retention. The model's R2 value was 39.8, its F-value was 563.285, and its p-value was 0.000, according to the results.

Table - 5 Regression Model Summaries for the Proactive engagement initiatives on Student retention

Model	R	R Square	Adjusted R Square	Std.Errors of the Estimate	ANOVA Results			
					F-Value	df1	df2	Sig.
1	0.631[a]	0.398	0.397	0.69792	563.285	1	899	0.000
a.Predictors:(Constant), Proactive engagement initiatives								

The following Table - 6 displays the predictor effects as well as the beta estimates, or the summary results of the coefficients. The results show that the β value is 0.811, the standard error is 0.033, the t-value is 24.323, and thep-valueis0.000. Based on this data, we deduce that the dependent variable in the suggested hypothesis is consistent with the predictor variable. Accordingly, the researcher declared that the alternative hypothesis (H3) is accepted and the suggested null hypothesis is rejected. The regression equation for the relevant hypothesis is as follows:

Student retention (Y) = 1.667+ 0.462 (Proactive engagement initiatives) X

Table - 6: Predictor effects and Beta Estimates (Unstandardized) for Student retention Associated with Proactive engagement initiatives.

Model	Variable	Unstandardized Coefficients		Standardized Coefficients	t-Value	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.667	0.104	-	15.974	0.000
	Proactive engagement initiatives	0.462	0.019	0.631	23.734	0.000
a. Dependent Variable: Student retention						

Summary of the Hypotheses assessment ($H1_0$ – $H3_0$)

Table 7 provides the glimpses over the assessment of the proposed hypotheses of the study. Each proposed hypothesis in the model and the results are provided in the following table.

Table - 7 Summary of the Hypotheses Testing ($H1_0$ – $H3_0$)

Sl. No	Independent Variable	Dependent Variable	Hypothesis	Supported or not
1	Time management competence	Student retention	$H1_0$	NO
2	Real time feedback mechanism	Student retention	$H2_0$	NO
3	Proactive engagement initiatives	Student retention	$H3_0$	NO

Conclusion:

Based on the derived statistical results, it is observed that all the proposed independent variables like, Time management competence, real time feedback mechanism and proactive engagement are significant with respect to the student retention in the Indian higher education sector. Hence, the study conclude that the temporal leadership is required to reduce the dropouts in the Indian Higher education sector.

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