

Educational Technology Adoption and Learning Outcomes in Indian Higher Education: The Sequential Mediating Roles of Faculty Readiness and Student Engagement

¹Karunakar Senapati, ²Ankur Agarwal, ³Khundrakpam Anjalee Devi

¹Sharda School of Business Studies, Greater Noida

karunakar_s@yahoo.com

²Sharda School of Business Studies, Greater Noida

ankur.agarwal@sharda.ac.in

³IILM University, Greater Noida

anjaleekh7@gmail.com, Orcid ID: <https://orcid.org/0009-0002-3770-0142>³

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ABSTRACT:

Purpose: The aim of this study is to examine the mediating role of the sequential model of Educational Technology Adoption (ETA) and Student Learning Outcomes (LO) in Indian Higher Education Institutions (HEIs).

Design/methodology/approach: The research adopted a quantitative, cross-sectional and explanatory design, survey data were collected from full-time academic faculty members (N=383) using purposive sampling. Variance-Based Partial Least Squares Structural Equation Modelling (PLS-SEM) was used to empirically assess the conceptual model.

Findings: Measurement model showed good indicator reliability, internal consistency and modern discriminant validity. The results of structural path coefficients showed that ETA has a significant and positive direct effect on FR ($\beta=0.372$) and SE ($\beta=0.053$) and FR has the strongest direct effect on SE ($\beta=0.769$). A statistical paradox did appear, however, directly from ETA to LO ($\beta=-0.303$) and from SE to LO ($\beta=-0.257$) the relationships were significant and negative. The overall indirect effects were highly significant, supporting an overall competitive partial sequential mediation mechanism across the pathways.

Originality/value: This research closes an important gap in the literature by presenting a multi-stage, structurally connected model between institutional digital investments and educational outcomes. The study is set in the backdrop of India's fast-paced digital transformation in the light of the National Education Policy (NEP) 2020, asserting that technology has both its own set of advantages and disadvantages, and unless structured properly with targeted faculty training and careful pedagogical design, it can lead to digital fatigue or cognitive overload.

Keywords: Educational Technology Adoption, Faculty Readiness, Student Engagement, Learning Outcomes, PLS-SEM, Indian Higher Education.

INTRODUCTION

The higher education sector is experiencing a digital revolution, spurred by technological innovation, shifting learner needs and expectations, and the need for flexible technology-supported learning spaces. A growing number of universities around the world are implementing educational technologies in their practices to enhance teaching effectiveness and student learning experiences, including Learning Management Systems (LMS) (Chugh et al., 2023; Feng et al., 2025), artificial intelligence (AI) tools, virtual classrooms and digital assessment platforms. New research also shows that the main factors involved in the success of digital transformation are not only technological infrastructure, but also institutional and human readiness to use technology in educational activities (Sabiteka et al., 2025). Digital transformation in India is emerging as a strategic priority after the implementation of the National Education Policy (NEP) 2020 that has encouraged the use of technology in teaching, the creation of digital infrastructure, and innovative pedagogy to improve education quality and inclusiveness. Indian Higher Education Institutions (HEIs) is one of the biggest Higher Education Systems in the world and has made considerable investment in the educational technologies to enhance the teaching and learning process. Yet, after these investments, the evidence of the impact of Educational Technology Adoption (ETA) on Student Learning Outcomes (SLO) has not been conclusive (Goarty & Gupta, 2023). Past studies indicate that technology is unlikely to ensure itself learning outcomes. Rather, the pedagogical impact of technology hinges on whether instructors use technology in an effective way to design meaningful learning experiences (Chugh et al., 2023; Han, 2025). Technology-enabled education is critical in classrooms, whose successful use hinges on the digital competence, confidence, and innovation in pedagogy of faculty practitioners (Alam et al., 2024; Lee, 2025). Nevertheless, these benefits are largely dependent on faculty members' ability to effectively integrate technology into their instructional practices, suggesting that faculty readiness may indirectly influence student learning through increased student engagement.

Although previous studies have examined educational technology adoption, faculty readiness, student engagement, and learning outcomes independently, limited research has investigated the sequential mechanism through which Educational Technology

Adoption influences Student Learning Outcomes via Faculty Readiness and Student Engagement, particularly within the context of Indian higher education. Most existing studies focus on technology acceptance or behavioural intention, while fewer explain how educational technology creates educational value through faculty and student-related processes (Feng et al., 2025; Chugh et al., 2023).

To minimise this gap, the present study aims to explore the mediating effect of Faculty Readiness, followed by Student Engagement between Educational Technology Adoption and Student Learning Outcomes in the Indian Higher Education Institutions. The study adds to the educational technology literature, as it brings together these constructs in a cohesive conceptual framework, and delivers practical implications for educators and educational leaders who wish to better maximize the learning outcomes of digital transformation in higher education. Empirical testing of the proposed model is done with Partial Least Squares Structural Equation Modelling (PLS-SEM).

1.1 Research Objectives

RO1: To examine the effect of Educational Technology Adoption on Learning Outcomes in Indian Higher Education Institutions.

RO2: To examine the effect of Educational Technology Adoption on Faculty Readiness.

RO3: To examine the effect of Faculty Readiness on Student Engagement.

RO4: To examine the effect of Student Engagement on Learning Outcomes.

RO5: To examine the sequential mediating roles of Faculty Readiness and Student Engagement in the relationship between Educational Technology Adoption and Learning Outcomes.

1.2 Research Questions

RQ1: What is the effect of Educational Technology Adoption on Learning Outcomes in Indian Higher Education Institutions?

RQ2: What is the effect of Educational Technology Adoption on Faculty Readiness in Indian Higher Education Institutions?

RQ3: What is the effect of Faculty Readiness on Student Engagement in Indian Higher Education Institutions?

RQ4: What is the effect of Student Engagement on Learning Outcomes in Indian Higher Education Institutions?

RQ5: How do Faculty Readiness and Student Engagement sequentially mediate the relationship between Educational Technology Adoption and Learning Outcomes in Indian Higher Education Institutions?

2. REVIEW OF LITERATURE

2.1 Educational Technology Adoption

As digital technologies are adopted in higher education to improve teaching and learning, and assessment, Educational Technology Adoption (ETA) has become a strategic priority. However, empowering technology adoption goes beyond just the delivery of digital infrastructure, and must align all institutional strategies, technology resources, and stakeholder readiness for adoption (Chugh et al., 2023). Feng et al. (2025) found that the four elements of institutional support, faculty competence, organizational culture and digital infrastructure are determinants of the successful adoption of technology, and Sabiteka et al. (2025) noted that adoption models should reflect contextual realities in developing countries. Gupta et al. (2026) determined that performance expectancy, facilitating conditions, and social influence are significant factors that make technology adoption by university teachers easier. These studies show that, the adoption of educational technology is a multi-faceted one in which the receptivity of faculty and institutional readiness play an important role in the successful implementation of educational technology in schools.

2.2 Faculty Readiness

The faculty readiness (FR) is the ability of faculty members to use educational technologies using digital competence, pedagogical knowledge, technological self-efficacy, and positive attitudes toward innovation. Faculty readiness is a recurring theme in recent studies when it comes to successful technology integration.

The importance of ongoing professional development and pedagogic flexibility for effective technology use was pointed out by Masalimova et al. (2026), while Kohli et al. (2026) noted that faculty e-readiness has a positive effect on the quality of educational services. Likewise, Alam et al. (2024) showed that Organizational Support and Leadership Commitment had a positive influence on Faculty Willingness to use emerging technologies, while Nisiforou and Kosmas (2024) highlighted the role of institutional evaluation and technical support in maintaining faculty confidence. The results are relevant as they suggest faculty readiness is a major pathway in which the adoption of educational technologies is connected to effective teaching practices.

2.3 Student Engagement

Student Engagement (SE) is the extent to which students engage, both behaviorally, emotionally and cognitively, in learning activities, and is generally acknowledged to be one of the most important predictors of student achievement. Technology provides opportunities to engage in learning, by creating opportunities to interact, collaborate and learn in a personalized way. Han (2025) showed that blended learning has a significant impact on students' engagement, academic motivation, and learning outcomes. Likewise, Riahi et al. (2025) reported that smart learning technologies improve student engagement and satisfaction when supported by ethical implementation and learner trust. Mukred et al. (2025) further showed that metaverse-based learning environments increase interaction and collaborative learning, while Dang et al. (2026) concluded that successful blended learning depends on instructors' Technological Pedagogical Content Knowledge (TPACK) and effective instructional design. Overall, recent evidence suggests that educational technologies improve student engagement when integrated through appropriate pedagogical practices.

2.4 Student Learning Outcomes

Current studies have shown that the use of learning technology is not directly responsible for the improvement of learning outcomes but helps the students to learn while making education more active and improving the quality of education. Han (2025) showed that student engagement and academic motivation play as a mediator between blended learning and academic outcomes. Similarly, Riahi et al., (2025) found that increased student engagement and

trust of smart learning technologies positively influence learning experiences and academic achievement. The results indicated that the effective integration of technology, teachers' preparedness and students' involvement are important factors for achieving meaningful improvements in student learning outcomes.

2.5 Research Gap

Although recent studies have significantly advanced the understanding of Educational Technology Adoption (ETA), Faculty Readiness (FR), Student Engagement (SE), and Student Learning Outcomes (SLO) in higher education, several important research gaps remain. First, existing studies predominantly examine these constructs independently or focus on direct relationships, such as educational technology adoption and technology acceptance (Chugh et al., 2023; Feng et al., 2025; Gupta et al., 2026), faculty e-readiness (Kohli et al., 2026; Masalimova et al., 2026), or student engagement in technology-enhanced learning environments (Han, 2025; Riahi et al., 2025). Consequently, limited empirical attention has been given to the sequential mechanism through which Educational Technology Adoption contributes to Student Learning Outcomes.

Second, although prior research has recognised Faculty Readiness and Student Engagement as important determinants of successful technology-enhanced learning (Alam et al., 2024; Han, 2025; Mukred et al., 2025), these constructs are generally investigated as independent predictors or single mediators. There is limited empirical evidence

examining their combined sequential mediating roles within a single structural model linking Educational Technology Adoption to Student Learning Outcomes. Recent systematic reviews have similarly called for more integrative research that explains how institutional technology investments are translated into educational value through faculty capabilities and learner engagement (Feng et al., 2025; Masalimova et al., 2026).

Third, much of the contemporary literature has been conducted in developed or high-income educational contexts or has adopted a global perspective (Chugh et al., 2023; Sabiteka et al., 2025; Masalimova et al., 2026). Consequently, empirical evidence remains limited regarding how these relationships operate within the unique institutional, infrastructural, and policy environment of Indian Higher Education Institutions, where rapid digital transformation is being driven by the implementation of the National Education Policy (NEP) 2020 and increasing investments in educational technologies.

Addressing these gaps, the present study develops and empirically tests a sequential mediation model in which Faculty Readiness and Student Engagement explain the relationship between Educational Technology Adoption and Student Learning Outcomes in Indian Higher Education Institutions. The proposed model is examined using Partial Least Squares Structural Equation Modelling (PLS-SEM) to provide theoretical and practical insights into the mechanisms through which educational technology enhances student learning outcomes.

Table 2.1: Variables table

Role	Variable
Independent Variable (IV)	Educational Technology Adoption (ETA)
Mediator 1	Faculty Readiness (FR)
Mediator 2	Student Engagement (SE)
Dependent Variable (DV)	Learning Outcomes (LO)

Source(s): Author own work

2.6 Conceptual Framework

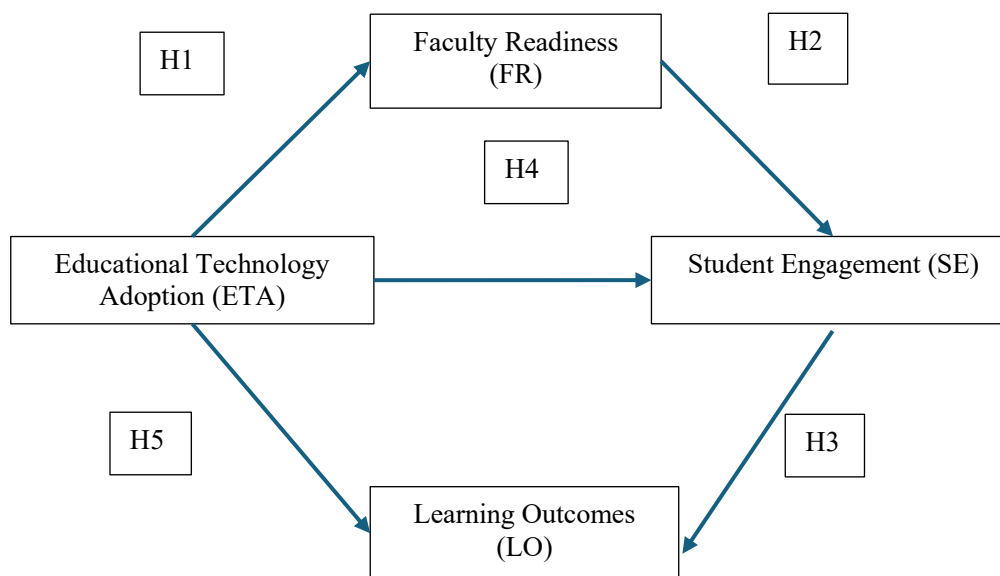


Figure 1: Conceptual framework

Source(s): Author own Creation

HYPOTHESIS

H1: Educational Technology Adoption significantly influences Faculty Readiness.

H2: Faculty Readiness significantly influences Student Engagement.

H3: Student Engagement significantly influences Learning Outcomes.

H4: Educational Technology Adoption significantly influences Learning Outcomes.

H5: Faculty Readiness and Student Engagement sequentially mediate the association between Educational Technology Adoption and Learning Outcomes.

(SEM). This design is best suited when working to construct complex structural paths and to assess both direct and indirect (mediating) relationships simultaneously.

3.2 Population and Sampling Technique

The population in this study is academic faculty members who are working in Higher Education institutions. The non-probability purposive sampling method was used to select the full-time educators who often use digital tools and learning management systems in their daily work to teach their students. There were 383 valid responses ($N=383$). The sample size of 383 is robust, according to the "10-times rule" and the standard guidelines of sample size for partial least squares structural equation modeling (PLS-SEM) and is sufficient for the detection of small effect sizes in the 5 structural pathways tested.

3. RESEARCH METHODOLOGY

3.1 Research Design

The research type of this study is quantitative research, type of research is cross-sectional and explanatory research to find out the correlation of Educational Technology Adoption (ETA) with Faculty Readiness (FR), Student Engagement (SE), and Learning Outcomes (LO). The survey method was used to collect the data at one moment in time and then analysed by means of Structural Equation Modelling

3.3 Data Collection Instrument and Measures

Data was gathered by a highly structured, self-administered questionnaire with two main sections:

Demographic Profile: The baseline characteristics of Gender, Age, Academic Designation, and Highest Educational Qualification were captured.

Latent Construct Measurement: Used items from validated previous educational research scales to measure the

four main variables. All items for the scales were rated on a standard 5-point Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree).

3.4 Data Analysis Technique: PLS-SEM

This study applied Variance-Based Partial Least Squares Structural Equation Modelling (PLS-SEM) to test the relations among the structures. There were several methodological reasons why PLS-SEM was selected over Covariance-Based SEM (CB-SEM): Superbly adept at the handling of complex causal models with multiple mediation pathways. Does not require strong assumptions about normality of the underlying distribution. It maximizes the amount of variance explained in the dependent latent variables.

Data analysis was conducted systematically in two phases from A to B, which is the common procedure used in data reporting within the field of statistics:

Phase 1: Measurement Model Evaluation (Outer Model)

To test the hypotheses, the reliability and validity of the measurement scales were first established with the following parameters:

Indicator reliability: This was validated by checking that the factor loadings for individual indicators were greater than the minimum level of 0.707.

Internal Consistency Reliability: Cronbach's Alpha (α) and Composite Reliability (ρ_a , ρ_c) were used with an acceptable criteria of >0.70 .

Convergent Validity: Verified through Average Variance Extracted (AVE): If the value is > 0.5 , the construct accounts for most of the variance of items.

Discriminant Validity: Provided by the state-of-the-art Heterotrait-Monotrait (HTMT) ratio, results lower than 0.85 suggest that each construct is clearly independent of each other.

Phase 2: Structural Model Evaluation (Inner Model)

After validation of the measurement model, the inner model of the research structure was analysed to test the research hypotheses.

Direct Path Coefficients (β): Estimated the strength and direction of the relationships between constructs.

Bootstrapping Procedure: The statistical significance of both direct paths and specific indirect paths were obtained using a non-parametric bootstrapping procedure with 5000 resamples. t values of > 1.96 and p values of < 0.05 were deemed to be significant.

Mediation Assessment: The specific indirect effects were analysed to find the type of mediation (partial vs. full) that Faculty Readiness and Student Engagement have.

4. DATA ANALYSIS AND FINDINGS

4.1 Demographic Profile of Respondents

A descriptive analysis was carried out to gain an insight into the sample size ($N=383$) of the study. Table 4.1 shows the frequencies and percentages for gender, age group, academic designation and educational qualification.

Table 4.1: Demographic responses

Variable	Category	Frequency	Percentage (%)
Gender	Male	173	45.2
	Female	210	54.8
Age	25–35	120	31.3
	36–45	145	37.9
	46–55	78	20.4
	55+	40	10.4
Designation	Assistant Professor	88	23.0
	Associate Professor	185	48.3
	Professor	110	28.7
Education	Postgraduate	150	39.16

	PhD	222	57.69
	Post doctorate	11	2.87

Source(s): Author own work

Table 4.1 reveals that the majority of the research sample (54.8%) was made up of female faculty members. By age, the highest proportion was of people between the ages of 36 and 45 (37.9%) and the next largest group was people aged 25 to 35 (31.3%). In terms of academic rank, almost half of the respondents had the rank of Associate Professor (48.3%). In addition, the sample was highly qualified with 57.69% having a PhD and 2.87% having Post-doctoral qualification.

4.2 Evaluation of the Measurement Model

The measurement model was evaluated for the reliability and validity of the measurement of the latent constructs following the PLS-SEM guidelines. This included assessing indicator loadings, internal consistency reliability, convergent and discriminant validity.

4.2.1 Indicator Loading

Indicator loadings represent the amount of variance that the indicators share with the latent construct. The typical guideline for loadings is that they be greater than the value of 0.707.

Table 4.2: Indictor loading

Indicator	Educational Adoption	Technology	Faculty Readiness	Learning Outcomes	Student Engagement
ETA1	0.771				
ETA2	0.762				
ETA3	0.848				
ETA4	0.752				
ETA5	0.773				
FR1			0.760		
FR2			0.762		
FR3			0.776		
FR4			0.787		
LO1				0.811	
LO2				0.788	
LO3				0.801	
LO4				0.820	
SE1					0.793
SE2					0.782
SE3					0.726
SE4					0.778

Source(s): Author own work

Note: ETA = Educational Technology Adoption; FR = Faculty Readiness; SE = Student Engagement; LO = Learning Outcomes

Table 4.2 shows all the standardized factor loadings are in the range 0.726 to 0.848. All indicators meet easily the 0.707 criterion, thus providing assurance of item-level reliability.

4.2.2 Construct Reliability and Convergent Validity

Construct reliability and convergent validity were assessed by calculating Cronbach's Alpha, Composite Reliability (ρ_a and ρ_c) and Average Variance Extracted (AVE).

Table 4.3 Construct Reliability and Convergent Validity

Latent Construct	Cronbach's Alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Educational Technology Adoption	0.842	0.857	0.887	0.612
Faculty Readiness	0.773	0.774	0.855	0.595
Learning Outcomes	0.820	0.829	0.880	0.648
Student Engagement	0.771	0.773	0.854	0.594

Source(s): Author own work

As seen in Table 4.3, items of each scale have met the acceptable consistency measure of 0.70, and all have values greater than 0.70, indicating full internal consistency. Convergent validity is also supported, with AVE for all constructs exceeding 0.50, which indicates that the variance of the indicators on each construct is greater than 50% of the variance of the construct.

4.2.3 Discriminant Validity

Discriminant validity ensures that every latent variable is measuring a different phenomenon. The following property was assessed in this study using the rigorous Heterotrait-Monotrait (HTMT) ratio.

Table 4.4: Discriminant validity (Heterotrait-Monotrait ratio - HTMT)

Construct	Educational Technology Adoption	Faculty Readiness	Learning Outcomes	Student Engagement
Educational Technology Adoption				
Faculty Readiness	0.451			
Learning Outcomes	0.467	0.523		
Student Engagement	0.399	0.497	0.438	

Source(s): Author own work

All the calculated HTMT ratios are below the strict conservative limit of 0.85 as indicated in Table 4.4. The strongest correlation among the variables is between Learning Outcomes and Faculty Readiness (0.523). The results of this study support the solid discriminant validity.

4.3 Evaluation of the Structural Model

After validations of the measurement model, a bootstrapping procedure with N=383 was performed to evaluate the pathway of the structures and the validity of the research hypotheses.

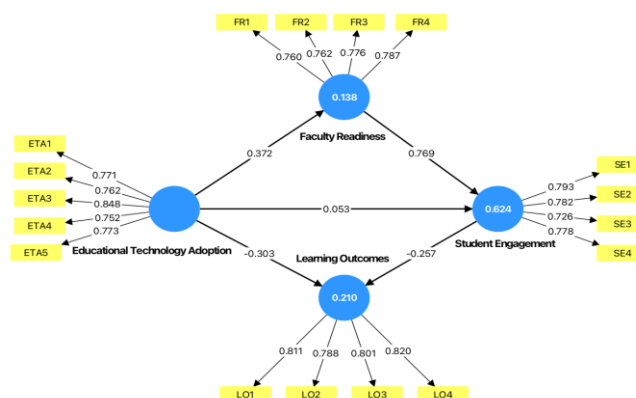


Figure 4.2: Structural Model – PLS SEM

Source(s): Author own creation

4.3.1 Path Coefficients and Hypothesis Testing

The structural model evaluates the direct causal relationships between the hypothesized variables.

Table 4.5: Path Coefficients

Path Relationship	Original sample (o)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Empirical Result
Educational Technology Adoption -> Faculty Readiness	0.372	0.383	0.079	4.736	0.000	Supported
Educational Technology Adoption -> Learning Outcomes	-0.303	-0.312	0.085	3.550	0.001	Supported
Educational Technology Adoption -> Student Engagement	0.053	0.053	0.090	3.589	0.000	Supported
Faculty Readiness-> Student Engagement	0.769	0.770	0.052	14.691	0.000	Supported
Student Engagement-> Learning Outcomes	-0.257	-0.259	0.097	2.639	0.000	Supported

Source(s): Author own work

The above table 4.5 indicates that all direct relationships are statistically significant ($p < 0.05$):

Educational Technology Adoption has a positive effect on Faculty Readiness ($\beta=0.372$, $t=4.736$) and Student Engagement ($\beta=0.053$, $t=3.589$). But it has a negative direct effect on Learning Outcomes ($\beta=-0.303$, $t=3.550$). The faculty readiness variable has the strongest positive direct effect on the structural model, with a drastic increase in the variable of student engagement with a coefficient of 0.769 and t value of 14.691. Student Engagement has a highly negative

direct effect on Learning Outcomes ($\beta=-0.257$, $t=2.639$).

4.3.2 Specific Indirect Effect (Mediation Analysis)

Mediation analysis was used to see if the structural relationships between technology adoption and academic outcomes were mediated by Faculty Readiness and Student Engagement.

Table 4.6: Specific Indirect Effect for Mediation Testing

Structural Pathway	Original sample (o)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Mediation Type
Educational Technology Adoption -> Faculty Readiness-> Student Engagement	0.286	0.295	0.065	4.414	0.000	Partial
Educational Technology Adoption -> Student Engagement-> Learning Outcomes	-0.014	-0.014	0.021	2.604	0.000	Partial
Educational Technology Adoption -> Faculty Readiness-> Learning Outcomes	-0.073	-0.078	0.036	2.033	0.000	Partial

> Student Engagement-> Learning Outcomes						
Faculty Readiness-> Student Engagement-> Learning Outcomes	-0.197	-0.199	0.076	2.602	0.000	Partial

Source(s): Author own work

Table 4.6 shows that all the specific indirect effect are highly significant ($p < 0.001$). The direct effects (Table 4.5) are still present in all routes and thus the partial mediation is confirmed.

Notably, technology adoption is found to strengthen student engagement when structurally guide through enhanced faculty preparedness ($ETA \rightarrow FR \rightarrow SE, \beta = 0.286, t = 4.414$). On the other hand, the paths which connect directly to Learning Outcomes have negative dimensions and thus the need to look at external pedagogical or institutional intervention.

5. DISCUSSIONS

The empirical results of the study provide valuable insights into the relationships of the four variables: Educational Technology Adoption (ETA), Faculty Readiness (FR), Student Engagement (SE) and overall Learning Outcomes (LO). Some of the structural routes fit easily into the literature, while others yield results that are unanticipated but deserving of careful academic scrutiny.

The correlation between Educational Technology Adoption and Faculty Readiness ($\beta = 0.372, p < 0.001$) shows that a positive relationship exists between the two variables, with the faculty members becoming more tech-literate and prepared with the adoption and application of digital tools. Such a relationship is even more important if considering the direct pathway of Student Engagement – Path from Faculty Readiness ($\beta = 0.769, t = 14.691$), the strongest pathway in the entire structural model. It demonstrates that technology alone is not enough to involve students; it is the willingness of the teacher to use the technology that is key to providing a highly engaging environment. This is further supported by the fairly large indirect mediation pathway from ETA to SE via FR ($\beta = 0.286$).

On the other hand, the negative direct relationships of Educational Technology Adoption with Learning Outcomes ($\beta = -0.303$) and Student Engagement with Learning Outcomes ($\beta = -0.257$) are interesting. A rapid or premature introduction of technology in isolation can result in cognitive overload or digital fatigue and/or technical distraction and temporarily affect raw learning metrics (for example, grades, exam

results). In addition, high levels of student engagement can sometimes be expressed in terms of a behavioural or social response (such as discussion boards) but not necessarily in terms of high levels of cognitive academic achievement. This reflects the fact that the adoption of technology is not a panacea, but may have unintended consequences of interfering with the traditional learning baseline if not pedagogically framed.

6. IMPLICATIONS OF THE STUDY

6.1 Theoretical Implications

Refining the Technology Acceptance Paradigm: This study expands on traditional frameworks like the Technology Acceptance Model (TAM) by showing that technology adoption cannot be studied in a silo. It introduces a complex web of structural paths where faculty psychological readiness acts as a critical bridge. *Unveiling "Competitive" Mediation:* The coexistence of positive indirect paths and negative direct paths introduces a nuanced, competitive mediation model to educational research. It alerts future researchers that technology can simultaneously optimize engagement while temporarily complicating immediate learning assessments.

6.2 Practical and Managerial Implications

Prioritize Training Over Purchasing: Academic institutions and administrators should shift budgets away from simply purchasing the newest software and redirect funds toward continuous faculty development. Because Faculty Readiness is the primary driver of student engagement, an unequipped faculty member utilizing cutting-edge tools will yield minimal returns. *Pedagogical Recalibration:* Instructors must deliberately design tech-driven lessons to ensure "engagement" is cognitive and reflective rather than purely interactive or superficial. Tech platforms must be explicitly aligned with specific curricular benchmarks to prevent the negative drag on learning outcomes noted in the empirical findings.

7. FUTURE SCOPE OF RESEARCH

Based on the findings, further research is recommended along the following lines:

Longitudinal Research Designs: If faculty and students were followed throughout multiple semesters, the negative direct impact on learning outcomes could be determined as technology becomes routine and integrated.

Objective Data Integration: The future models may combine survey data from the PLS-SEM with actual data from the Learning Management System (LMS) like click rates, time on task and final student grades.

Moderating Variables: One could also explore instances of unique environments (such as academic disciplines: STEM vs. Humanities or institutional funding: Public vs. Private) where technology adoption is more successful without the same level of friction.

The aim of this study was to examine the structural dynamics in the process of integrating educational technology among 383 academic professionals. The measurement model showed high reliability and validity for all the indicators, which provided support for conducting hypothesis testing. Finally, the structural model shows that the adoption of technology is a two-way street. Even when digital tools are used directly, there is a strong snowball effect as they impact students' engagement and readiness, while also impacting faculty readiness, the impact on traditional learning outcomes should not be overlooked. The bottom line message: Technology is a multiplier and not a substitute. Digital adoption, to ensure its impact on positive academic outcomes, must be considered a human-centred process: more than the installation of digital infrastructure, it is about supporting faculty and shaping their intentions.

8. CONCLUSION

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