

From Knowledge Sharing to Innovative Teaching Behavior: The Conditional Role of Motivation and Engagement among Faculty in Higher Education

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Abstract

This paper will discuss the influence of knowledge sharing on innovative teaching behaviour amidst faculty in the university sector of higher education in Pakistan whilst taking into consideration the functions of employee motivation and employee engagement. The nature of instructional innovation in academic settings that receive high levels of knowledge is increasingly reliant upon the ability of faculty members to access collegial knowledge, pedagogical resources, and classroom learning. The quantitative, cross-sectional survey design was employed to gather data of 322 faculty members working in the selected universities in Islamabad. The model suggested was evaluated using PLS-SEM (SmartPLS). The results of the measurement-model supported reliability and validity, which meant that the constructs were measured in a consistent way and were empirically different. Findings of the structural-model indicate that knowledge sharing is a considerable positive predictor of innovative teaching behaviour, and therefore faculty members who share knowledge actively in terms of teaching topics are more inclined to develop and use new teaching methods. The positive relationship exists between employee engagement and innovative teaching behaviour is also high with signs of vigor, dedication, and absorption as important in the maintenance of effort to enact teaching innovations. Employee motivation is also a positive factor and this implies that motivated faculty are more likely to put in discretionary effort in teaching improvement. Generally, the model describes a significant percentage of variance in innovative teaching behaviour. The implications of these findings on the leadership of universities will be practical because they will highlight the importance of institutionalizing knowledge-sharing practices and the importance of reinforcing faculty engagement and motivation support in order to promote teaching innovation in higher education.

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Keywords: knowledge sharing, innovative teaching behavior, employee engagement, employee motivation, higher education, Pakistan, PLS-SEM.

1 Introduction

Knowledge is a concept that is largely being considered as a strategic resource in the modern knowledge economy that is defining organizational capability, learning and sustainable advantage, particularly in the knowledge-intensive industries including higher education (Alavi and Leidner, 2001; Grant, 1996). But nothing is as good as knowledge becomes when it is shared among individuals within an organization via deliberate sharing and replication. In this connection, knowledge sharing, or, to be more exact, the process of free sharing of expertise, experience, and practical information, allows individuals to get new ideas, address complicated issues, and keep on enhancing professional practice (Wang and Noe, 2010). The impact of knowledge sharing in higher education institutions (HEIs) is particularly significant since academic work is knowledge-driven by nature, and knowledge exchange facilitates not only the research effectiveness but also the further improvement of the teaching practice and learning design (Al-Kurdi et al., 2018).

The recent synthesis evidence indicates that the study of knowledge sharing among scholars is growing but still has an uneven scope of research focus and unequal coverage of antecedents and consequences. As an example, Fan and Beh (2024) show that benefits, culture, and leadership have become the primary focus of most studies in higher-education knowledge sharing, and relatively less effort has focused on costs, organizational structure, and technology-related limitations, which may have a significant influence on the translation of knowledge sharing into practice in academic work. This deficiency is more consequential in HEIs since the quality of teaching is more likely to be based on the ability of the faculty members to gain peer knowledge and use it to redesign the instructional approach, innovation in assessment, and technology-mediated learning (Fan and Beh, 2024).

Innovative teaching behaviour is the key outcome in this study; the deliberate activities by the faculty members to create, share, and use new and beneficial teaching concepts, pedagogical techniques, learning events, or assessment practices to enhance teaching and learning experiences of students. The recent academic research helps to understand that teacher innovation is not an occurrence but a planned, stepwise process that encompasses the idea generation, its development, implementation, evaluation, and sharing (Liu et al., 2024). This is consistent with the long-held organizational innovation views in which innovative work behaviour is conceptualized as a multistage process of idea generation, promotion and implementation (Janssen, 2000; Scott and Bruce, 1994), and the recent evidence-based education evidence indicates that there is still persistent conceptual and methodological inconsistency in innovative work behaviour that needs to be more accurately modeled (Liu et al., 2024). Due to the nature of innovative teaching behaviour whereby it may also demand experimentation, peer mode of feedback and refinement before being incorporated in the classroom, knowledge sharing is theoretically placed in an ideal position to offer the informational contributions and social learning opportunities required to facilitate the process of teaching innovation.

However, the degree of knowledge sharing resulting in innovative teaching behaviour may differ within the faculties. There are two specific conditions connected with the boundaries that are significant: employee motivation and employee engagement. Motivation will tell the extent to which the faculty members are ready to put effort in, stick to teaching issues and transform common information to redesigned instructional practice (Deci & Ryan, 2000). As per this reasoning, a more recent systematic review conducted in the Educational Research Review emphasizes the idea that teacher motivation is intimately connected to teaching behaviours, but mechanisms through which motivation is converted into instructional behaviours are not yet well developed—a fact that prompts the need to include motivation in the lexicon of models that predict teaching practice (Lazarides et al., 2025). Equally, work engagement, a state of vigor, dedication,

and absorption, is also a favorable work-related state contributing to long-term effort and initiative which is required to introduce innovations in teaching (Schaufeli et al., 2006). Recent higher-education results also indicate that faculty involvement is a major predictor of innovation-based results; labor engagement has been found to mediate the impacts of job resources into innovative work behaviour among faculty staff (Hassan et al., 2024), and college-teacher engagement is an urgent problem when it comes to quality in higher-education (Zheng et al., 2025).

Industrial Context

Higher education is one of the driving forces of the nation based on human capital formation, ability to innovate as well as social mobility. Nevertheless, the education sector in Pakistan has experience structural limitations that have impacted on the overall efficiency of the institutions and the quality of instruction and learning conditions. As the development accounts are always evidenced-based, it is always observed that Pakistan has persistent issues regarding access to education and education outcomes, as well as historical strains associated with government funding and capacity (UNICEF Pakistan, n.d.). As an example, recent policy narrative released by UNICEF, namely in reference to Pakistan Economic Survey 2024-25, mentions the shrinking of public investment and that there is a lack of fiscal space that prevents teacher training and development as well as the learning resources and system strengthening without which is required in enhancing the quality of education at scale (UNICEF Pakistan, n.d.).

In this type of resource constrained environment the enhancement of instructional practice is deeply reliant on internal institutional learning, particularly, the ability of faculty members to share an efficient teaching methodology, adapt innovations to local classroom conditions, and collaborate to refine the curriculum and assessment. Here, the prospect of knowledge sharing among faculty members extends beyond the efficiency mechanism, and is instead a viable mode of maintenance of instructional enhancement in circumstances where formal training systems might be constrained. Nevertheless, knowledge sharing does not necessarily succeed. It is conditional on the motivation of the faculty members to make discretionary effort, as well as on their level of engagement to experiment with new teaching practices and apply them over time (Lazarides et al., 2025; Zheng et al., 2025). Thus, finding out how knowledge sharing can translate into innovative teaching behaviour and under which conditions of motivation and engagement such effect can be enhanced has both theoretical and practical importance to the higher education sector in Pakistan.

2 Literature Review

2.1 Knowledge Sharing

Knowledge sharing involves the exchange of tacit and explicit knowledge by individuals to enable other people to re-use this knowledge or modify this knowledge or add to it. It is often conceptualised in organizational contexts as a behavioural process, which entails donation of knowledge (to give one's expertise) and collection of knowledge (seeking and obtaining other people's knowledge) (Van den Hooff and De Ridder, 2004). Sharing of knowledge is of special importance to higher education, since scholarly practice relies on professional knowledge, which is built up through experience, e.g., pedagogical judgment, assessment design, classroom regulation techniques, and technology-based learning plans. The systematic review of the existing knowledge sharing by academics confirms the fact that knowledge sharing is an expanding area but poorly theorized and disjointed and that it requires better modeling in terms of how knowledge sharing leads to any meaningful results in scholarly work (Fan and Beh, 2024).

In Pakistan, the context of higher education, the emergent evidence is that knowledge sharing is also associated with the fundamental work outcomes and that motivation and engagement are human conditions that facilitate the conversion of knowledge behaviours into outcomes (Bibi et al., 2024). Nevertheless, although outcomes of performance have been investigated, less studies have specifically put innovative teaching behaviour in the centre of the outcomes, even though there are good theoretical grounds to assume so in a faculty setting.

2.2 Creative Pedagogical Behaviour

Innovative teaching behaviour is a type of teaching behaviour that depicts the active teaching behaviour by the faculty members in generating and applying new teaching practices that enhance the learning experiences. Recently, the review findings can help to elucidate, teacher innovation is more of a planned, sequential process involving idea formulation, practice, assessment, adjustment, sharing, and sustenance, as opposed to a solitary act of creativity (Liu et al., 2024). This idea fits the overall literature of innovative work behaviour, which considers innovation to be a process of behaviour in stages (Janssen, 2000; Scott and Bruce, 1994). Notably, the conceptual ambiguity and inconsistent measurement has also been highlighted as a factor in limiting cumulative progression of teacher innovation knowledge in the past, which supports the necessity of developing a more rigorous, theory-consistent modeling (Liu et al., 2024). In universities, innovative teaching behaviour is manifested in the redesigning of courses, the adoption of active learning approaches, the incorporation of educational technologies, innovative modes of assessment and evidence-based instruction experimentation.

2.3 Sharing knowledge and innovative teaching behavior

Sharing of knowledge will contribute to the innovative teaching behaviour in that the more the faculty members will have access to different pedagogical practices and the less uncertainty that generally accompanies instructional experimentation. Faculty sharing teaching knowledge is able to recombine the practices of their peers into new solutions, learn the viability of innovations and modify methods to local classroom constraints- so as to speed up the process of innovation in teaching. This logic is supported by empirical evidence in higher education situations. As an example, there is a study of college instructors that indicates that knowledge sharing has a positive correlation with innovative work behaviour in the academic environment and serves as a significant process in the innovation activities of universities (Liu and Sun, 2025). Thus, the proposed study is the following:

H1: The more does the knowledge sharing, the more the innovative teaching behaviour among the members of the faculty.

2.4 Intermediate Effect of Employee Motivation

Motivation will determine the extent to which the members of the faculty will use shared knowledge to redesign teaching practices as opposed to merely receiving information. According to the self-determination theory, in case of autonomous motivation (e.g., interest, purpose, internalized value) in individuals, they are more likely to invest more effort and persevere through difficult situations, which allows greater quality (Deci and Ryan, 2000). The recent synthesis of education is also indicative of the fact that there is a close relationship between teaching behaviours and teacher motivation, yet the mediating processes are underrepresented, which suggests that motivation is a focal matter to comprehend why the practices of teaching evolve (Lazarides et al., 2025). Based on this, the faculty members being more motivated should be more likely to convert shared knowledge into implemented teaching innovations. Thus, the study proposes:

H2: Employee motivation reinforces positive influence of knowledge sharing on innovative teaching behaviour among the members of the faculty.

2.5 Moderation of Role of Employee Engagement

Work engagement is a positive, satisfying work related affect that is characterized by energy, commitment and involvement, that encourages long-term initiative and additional effort (Schaufeli et al., 2006). Engagement in higher education is gaining popularity as a factor of educational quality, and recent studies show that faculty engagement in universities depends on job requirements and resources and is connected to the success of teaching-related work investment (Zheng et al., 2025). In addition to that, academic research demonstrates that the process of involvement can serve as one of the primary behavioural patterns connecting job

resources and innovative performance among academic employees (Hassan et al., 2024). Thus, active faculty members will be in a better place to respond to common knowledge, promote new teaching concepts, and maintain the course of action. Hence, the study proposes:

H3: This is because employee engagement enhances the positive effects of knowledge sharing on innovative teaching behavior by the faculty members.

3 Research Methodology

The hypothesized relationships between knowledge sharing (IV) and innovative teaching behaviour (DV) among the faculty of the university were tested by using a quantitative research design and the conditional (moderating) effect of employee motivation and employee engagement. Quantitative designs are suitable in case it is necessary to explore relationships between constructs with the help of numerical indicators and statistical estimation methods (Creswell & Creswell, 2018). Since the suggested framework presupposes a number of latent variables and interaction effects, the research study belongs to a tradition of theory-testing, model-based quantitative studies (Hair et al., 2022).

The research had a cross-sectional time period in that the respondents were sampled once to record the perceptions and behaviours of the target population at a single time. In organizational and educational studies, cross-sectional designs are common to explain associations between variables when it is not possible to conduct longitudinal follow-up (Bryman, 2016). The research is also explanatory as it seeks to explain the difference in innovative teaching behaviour by faculty based on sharing of knowledge and to determine whether motivation and engagement enhance the relationship of focus (De Vaus, 2001).

It was based on survey strategy that involved use of structured questionnaire as data-collector. Survey designs are especially appropriate to gather standardized answers of a specific population and to test the hypothesized paths between constructs to be tested (Dillman et al., 2014). A five-point Likert response scale was used to measure all the scale items, which ranged by strongly disagree to strongly agree (traditionally, as in the field of behavioural measurement research) (Likert, 1932).

It consisted of the deductive approach, where hypotheses were based on the available theoretical and empirical literature and further written through statistical modelling (Saunders et al., 2019). Consistent with this deductive position, the chosen research philosophy was positivist with its focus on observable measurement, objectivity, and testing of hypotheses by statistical evidence (Saunders et al., 2019).

The target population was faculty members of the necessary universities in Islamabad and the following universities were selected, namely, Air University, Bahria University, COMSATS University Islamabad, NUML University, and NUST, and the number of faculty members in each of these universities was estimated to be 1,937. The finalized size of the sample was 322 respondents calculated using the available sample size determination guidelines on finite populations (Krejcie and Morgan, 1970). The institutional representativeness was ensured with the help of multistage sampling: in the first stage, faculty members were measured in institutional strata (one stratum per university), and in the second stage, proportionate allocation was applied so that the number of responses obtained in each university represented its portion of the total population- a strategy that is often suggested to enhance representativeness in stratified survey research (Lohr, 2021).

The questionnaire has had two parts: the former section involved demographic factors (e.g. gender, highest qualification, and job experience) whereas the other section was used to measure the study constructs with the modified items adopted in the validated instruments. The conceptualization of knowledge sharing was based on knowledge donating and collecting behaviours in the academic workplace (Van den Hooff and De Ridder, 2004). Innovative teaching behaviour was measured as the intentional actions of the faculty members to produce, advance and execute new and helpful teaching thought and practice; this is consistent with multistage

views of innovation behaviour and current synthesis research that highlights conceptual accuracy in the measurement of teacher innovation (Liu et al., 2024). As needed, the measuring traditions of teacher innovative work behaviour were established and then served as the foundation of words and contextual changes (e.g., TIWBQ) (Zhang and Zhang, 2012). Employee engagement was asserted as an optimistic work-related condition depicting vigor, dedication and absorption (Schaufeli et al., 2006) and employee motivation was asserted using common motivational perspectives differentiating autonomous and controlled motivations in the workplace (Deci and Ryan, 2000). In the process of modifying the items into the local context of higher education, the general rules of when developing instruments were used to maintain the content validity and intelligibility (DeVellis, 2017). In case of translation necessities of any items, the back-translation processes are generally suggested to safeguard the semantic equivalents (Brislin, 1970). The SPSS was used to screen and summarize data (e.g., missing values and descriptive statistics), and PLS-SEM was used to test the hypotheses in SmartPLS. PLS-SEM can be used with prediction-focused models that have many constructs and moderate them with the help of interaction terms (Hair et al., 2022). Measurement model was assessed on basis of indicator loading, internal consistency reliability (Cronbachs alpha and composite reliability) convergent and discriminant validity using htmt criterion (Henseler et al., 2015). The structural model was evaluated through collinearity diagnostics (VIF), path and significance, direction of path coefficients through bootstrapping, explained variance (R2), and effect sizes (f2) (Hair et al., 2022). In order to test moderation, interaction terms (Knowledge Sharing x Motivation; Knowledge Sharing x Engagement) were tested and assessed within SmartPLS, and collinearity-based checks might also be used to provide further evidence of the possible common method bias in self-report designs (Kock, 2015).

3.1 Sampling Frame

Table 1 - Number of Faculty Members Employed

Universities	Number of Faculty Members Employed
COMSATS University, Islamabad	1117
Air University, Islamabad	93
NUML University, Islamabad	132
NUST University, Islamabad	461
Bahria University, Islamabad	134
Total	1,937

Table 1 presents the population distribution across the selected universities, establishing the basis for proportionate allocation during sampling. The sample size was determined using established sample size determination guidance for survey research (Krejcie & Morgan, 1970). Based on the population (N = 1,937), the finalized sample for data collection was 322. A multistage sampling procedure was applied. In Stage 1, the population was organized into five institutional strata (one stratum per university). In Stage 2, proportionate sampling was used so that representation from each university matched its share in the total population.

Table 2 - Exact Percentage of Data Collected

Universities	Data Collected (%)
COMSATS University, Islamabad	57.7%
NUST University, Islamabad	23.7%
Bahria University, Islamabad	7.0%
NUML University, Islamabad	6.8%
Air University, Islamabad	4.8%

Table 2 confirms proportionate allocation, enhancing representativeness of the sample across institutions.

3.2 Research Instruments

The questionnaire was divided into two parts. The former section included population demographics (e.g., gender, qualification, work experience). The second part involved the measurement of the core study constructs, Knowledge Sharing (KS), Innovative Teaching Behaviour (ITB), Employee Motivation (EM) and Employee Engagement (EE).

Notably, Innovative Teaching Behaviour is a conscious teaching innovation which entails the creation, application, and creation of results of new teaching concepts (Liu et al., 2024). Teacher innovative work behaviour instrument (e.g., Zhang and Zhang, 2012) is the most common instrument of operationalization of ITB that incorporates teaching ideas, actions/implementation and outcomes.

3.3 Measures and Sources

Table 3 - Distribution of Instrument Variables

S. No.	Variables	Items	Sources
1	Knowledge Sharing	3	Adapted from knowledge sharing behavior measures used in higher-education/organizational KS research
2	Innovative Teaching Behaviour (ITB)	7	Adapted from Teacher Innovative Work Behavior Questionnaire tradition (Zhang & Zhang, 2012)
3	Employee Motivation	6	Standard motivation measurement tradition (self-determination-based work motivation)
4	Employee Engagement	7	Work engagement measurement tradition; widely used engagement scales in education research

Table 3 shows that ITB replaces employee performance as the dependent construct, while the rest of the model variables remain conceptually consistent with your framework.

3.4 Data Analysis Technique (PLS-SEM)

The questionnaire was separated into two parts. The population demographics (e.g., gender, qualification, work experience) were contained in the former section. The second component entailed the measure of the core study constructs, which comprise Knowledge Sharing (KS), Innovative Teaching Behaviour (ITB), Employee Motivation (EM) and Employee Engagement (EE).

It is worthy to note that, Innovative Teaching Behaviour is a deemed teaching innovation that involves the development, implementation, and development of outcomes of novel instructional ideas (Liu et al., 2024). The most prevalent instrument of operationalization of ITB that includes

teaching ideas, actions/implementation and outcomes is teacher innovative work behavior instrument (e.g., Zhang and Zhang, 2012).

4 Results

4.1 Measurement Model - Convergent Validity

Convergent validity was assessed using Cronbach’s alpha, rho_A, Composite Reliability (CR), and AVE, following standard PLS-SEM criteria (Hair et al., 2022).

Table 4 - Convergent Validity

Variables	Cronbach's alpha (α)	rho_A (ρA)	Composite Reliability (CR)	AVE
Employee Engagement (EE)	0.858	0.867	0.893	0.548
Employee Motivation (EM)	0.931	0.937	0.946	0.745
Innovative Teaching Behaviour (ITB)	0.863	0.870	0.895	0.553
Knowledge Sharing (KS)	0.734	0.727	0.850	0.656

All constructs meet recommended internal consistency thresholds ($\alpha/CR \geq 0.70$) and convergent validity ($AVE \geq 0.50$), indicating that the indicators reliably represent their latent variables.

4.2 Discriminant Validity (HTMT)

Discriminant validity was evaluated using HTMT, which is recommended for variance-based SEM models (Henseler et al., 2015).

Table 5 - Discriminant Validity with HTMT

Variables	EE	EM	ITB	KS
Employee Engagement (EE)	0.796			0.629
Employee Motivation (EM)	0.744			
Innovative Teaching Behaviour (ITB)	0.843	0.673		
Knowledge Sharing (KS)	0.735	0.598	0.819	

Interpretation: All HTMT values are below 0.90, supporting discriminant validity and indicating that the constructs are empirically distinct.

4.3 Structural Model - Explanatory Power (R²)

Table 6 - Dependent Variable and Related R-Square

No.	Dependent Variable	R²
1	Innovative Teaching Behaviour (ITB)	0.646

The model explains 64.6% of the variance in faculty innovative teaching behavior, indicating strong explanatory power for behavioral research models.

Effect Size (f²)

Table 7 - Effect Size (f-Square)

Construct	Innovative Teaching Behaviour (ITB)
Employee Engagement (EE)	0.027 (small effect)

Construct	Innovative Teaching Behaviour (ITB)
Employee Motivation (EM)	0.121 (medium effect)
Knowledge Sharing (KS)	0.188 (medium effect)

Knowledge sharing shows the strongest practical contribution among predictors (medium f^2), followed by motivation (medium), while engagement exhibits a small incremental effect size.

4.4 Hypothesis Testing (Direct Effects)

Path coefficients (β), t-values, and p-values were obtained using bootstrapping (Hair et al., 2022).

Table 8 - Results of Structural Model and Hypothesis Testing

Hypothesis	Path	β	t-value	p	Decision
H1	KS $\rightarrow$ ITB	0.325	7.837	0.000	Supported
H2	EM $\rightarrow$ ITB	0.153	1.990	0.024	Supported
H3	EE $\rightarrow$ ITB	0.450	6.996	0.000	Supported

There is a positive and hugely important influence of knowledge sharing on the innovative behavior in teaching, which means that the more the faculty members share their pedagogical and professional knowledge, the more they are able to produce and apply innovative ideas in teaching. Motivation too has a significant positive impact, which means that motivated faculty would be more inclined to put efforts into testing instructional innovations. The positive effect of engagement is high implying that engaged faculty (vigor/dedication) have a higher chance of persistence and adoption of innovative teaching methods-which is in line with current conceptualizations of teacher innovation.

4.5 Collinearity Assessment (VIF)

Collinearity was assessed using VIF. For SEM models, VIF thresholds below problematic levels indicate that multicollinearity is unlikely to bias estimates; a stricter 3.3 threshold is often used in PLS-SEM (Kock, 2015).

Table 9 - Collinearity Assessments

Variables	Innovative Teaching Behaviour (ITB)
Employee Engagement (EE)	2.122
Employee Motivation (EM)	1.847
Knowledge Sharing (KS)	1.589

All VIF values are below 3.3, indicating no problematic multicollinearity.

4.6 Moderation Testing Note (for your “Moderating Role” claim)

Your current SmartPLS output (Tables 8–9) reports direct effects.

To formally test moderation, you must include interaction terms:

- KS $\times$ EM $\rightarrow$ ITB
- KS $\times$ EE $\rightarrow$ ITB

This is typically done in SmartPLS using the two-stage or product indicator approach, and then reporting the interaction β , t, p, plus simple slopes if needed (Hair et al., 2022). If you share the SmartPLS “Specific Indirect/Interaction Effects” output (or the interaction-path table), I will

insert the exact coefficients into a final moderation table and rewrite your moderation interpretation in publishable form.

5 Discussion

This research used PLS-SEM (SmartPLS) as a tool to estimate the relationship between knowledge sharing, employee engagement, and employee motivation and faculty innovative teaching behaviour (ITB). The results of the measurement models suggest that the constructs were measured in acceptable psychometric terms. The internal consistency indicators (Cronbachs alpha, rho A and composite reliability) were above the recommended minimum values whereas the values of AVE were above the 0.50 threshold in accordance with the modern guidelines of PLS-SEM evaluation (Hair et al., 2022). One method to determine discriminant validity was to examine the HTMT scores which are under the standard threshold ([?] .90) which corresponds to the HTMT criterion utilized in the variance-based SEM models (Henseler et al., 2015). Together, these findings add to the belief that the latent constructs, which were the knowledge sharing, engagement, motivation, and innovative teaching behaviour, were empirically differentiated and had a reliable measure.

Going to the structural model, the results indicate that the knowledge sharing is an important positive predictor of innovative teaching behaviour ($b = 0.325$, $t = 7.837$, $p < .001$). This implies that once faculty members positively share pedagogical know how, classroom experiences, instructional resources, and assessment practices, the faculty members become more likely to produce and use new teaching ideas and practices. This finding correlates with emerging evidence on higher-education that knowledge sharing endorses outcomes related to innovation among educators by augmenting access to ideas, lessening uncertainty regarding experimentation, and being adaptable to through collegial learning (Fan and Beh, 2024; Liu and Sun, 2025). It is also compatible with the modern perspective of teacher innovation being a process-staged and planned (development of an idea and its application) process in which professional exchange offers both information and social confirmation to adoption and further practice of innovative teaching methods (Liu et al., 2024). That is, knowledge sharing seems to be a viable fuel to ITB since it increases the teaching repertoire of faculty members and expedites the process of bringing new ideas to the classroom.

The second important finding is that the employee engagement has the most positive relationship with innovative teaching behaviour ($b = 0.450$, $t = 6.996$, $p < .001$). This shows that the more vibrant, committed and mentally engaged faculty members are in their work, the more they will be able to dedicate the long-term effort on the innovation of their teaching. This aligns with the emerging body of higher-education studies that prove that work engagement is a key psychological channel to innovation performance in academic personnel (Hassan et al., 2024) and that engagement-related processes provide meaningful explanations to discover innovative work behaviour among university teachers (Zargar et al., 2025). In effect, the process of teaching innovation may entail persisted work, creating new materials, trying new techniques, controlling risks in classrooms, and updating work following the feedback. Faculty members who are engaged are more likely to perpetuate this cycle and this is the reason why the engagement coefficient has a relatively higher coefficient than other predictors in the model.

The findings also indicate that innovative teaching behaviour also has a positive relation with employee motivation, although the effect is relatively lower ($b = 0.153$, $t = 1.990$, $p = .024$). This trend is theoretically possible since motivation, and especially autonomous motivation, promotes discretionary efforts and persistence, but this trend can only be converted into teaching innovation when faculty possess sufficient resources, favorable climates, and the chances to put their will into practice. Recent evidence of synthesis supports the idea that teaching behaviour has a strong connection to teacher motivation, although the area requires a better definition of the mechanisms through which the motivation can transform into tangible instructional actions (Lazarides et al., 2025). The large, albeit less important coefficient in the current study might show that motivation

is assisting ITB through enhancing the desire to attempt innovation, whereas actual implementation of innovative teaching is more strongly motivated by engagement (perpetuated energy and absorption) and sharing of knowledge (access to actionable teaching knowledge). According to model performance, R^2 (0.646) shows that a combination of the predictors explains a moderate percentage of the variance in innovative teaching behaviour (64.6) indicating a high explanatory power of the predictors on faculty behavioural outcomes. The effect sizes estimates also indicate that knowledge sharing has a significant practical impact ($f^2 = 0.188$), motivation has a moderate impact ($f^2 = 0.121$), and engagement has a smaller incremental impact ($f^2 = 0.027$) regarding the effect size conventions applied in the context of PLS-SEM (Hair et al., 2022). Also, the diagnostics of collinearity (VIF value below conservative levels) implies that the multicollinearity is not likely to bias the structural estimates (Kock, 2015).

Lastly, there is a model-specification implication of your above-said "moderating role" framing. The reported path structures are direct effects of motivation and engagement on ITB. In order to statistically prove the presence of moderation, terms of interaction (Knowledge Sharing x Motivation; Knowledge Sharing x Engagement) should be added and tested in the structural model (Hair et al., 2022). Thus, the current results strongly confirm that motivation and engagement are significant antecedents of ITB, but further studies ought to directly address the interaction effect to verify whether motivation and engagement enhance (or diminish) the knowledge sharing - ITB relationship.

5.1 Conclusion

This research gives support to the argument that the sharing of knowledge, employee engagement, and employee motivation are important predictors of faculty innovative teaching behaviour in higher education. The knowledge sharing became a powerful indicator suggesting that the faculty members are better prone to innovate their teaching in case they are regularly involved in sharing the pedagogical ideas and instructional materials with their colleagues (Fan and Beh, 2024; Liu and Sun, 2025). The most significant positive relationship was observed in the case of engagement, which implies that long-term vigor and commitment are key to transforming teaching concepts into classroom innovations (Hassan et al., 2024; Zargar et al., 2025). Motivation was also found to have a positive contribution to provide support to the notion that motivated faculty is more open to putting effort into innovation, though its translation into visible teaching behaviour might require other facilitating mechanisms (Lazarides et al., 2025). On the whole, the model can be used to explain a large percentage of variance in innovative teaching behaviour because it can be stated that one of the effective paths to raise the level of teaching innovation in universities is to intensify knowledge sharing practices and the psychological resources of the faculties.

5.2 Implications

The results have explicit implications on the leadership and policy in higher education. To start with knowledge sharing should be institutionalized in universities and not an extracurricular or voluntary activity. This may be reached by using departmental communities of practice, peer observation cycles, mentoring systems, and structured teaching-sharing forums like faculty share evidence-based practice, assessment templates, and technology-enabled teaching strategies, and those mechanisms are aligned with the larger higher-education knowledge sharing agenda (Fan & Beh, 2024). Second, since the engagement demonstrates the most significant linkage with the innovative teaching behaviour, universities should consider engagement as a strategic asset by enhancing job resources that could maintain teaching enthusiasm, i.e., teaching support units, manageable workload assignment, access to instructional design backing, teaching innovation recognition, and independence in making pedagogical choices. Recent studies of higher education suggest that mechanisms of engagement were central to the explanation of the outcomes of innovations among the academic staff (Hassan et al., 2024; Zargar et al., 2025). Third, motivation-based interventions must extend beyond monetary rewards and, instead, include significant

motivation in recognition, open teaching excellence promotion channels, and professional growth that instills faculty confidence to explore innovation, a strategy that is congruent with current discourse on how motivation is converted into teaching behaviour (Lazarides et al., 2025).

5.3 Limitations

There are a few limitations that should be admitted. To begin with, the cross-sectional design leaves causal inferences to chance; the relationships are equal to the theory but cannot prove directionality with time. Second, the research was based on self-reported survey measurements which may promote the risk of common method bias and overinflate the associations unless it is properly addressed (Podsakoff et al., 2024). Third, the sample size was limited to universities in Islamabad, and this might not be generalizable to other regions or/and institutional variations of the public/private in other parts of Pakistan. Lastly, even though the study theoretically aligns the motivational and engagement as moderators, the obtained results depict direct effects; the interaction between motivation and engagement does not necessitate direct interaction, which must be explicitly modelled in PLS-SEM (Hair et al., 2022).

5.4 Recommendations

To enhance the generalizability, the future studies would need to expand geographical area and contrast between public and private universities. This would be particularly helpful when implemented in a longitudinal design to estimate the predictive power of knowledge sharing and engagement on innovative teaching behaviour change over time and the effects of predictors on each other (e.g., is successful innovation in teaching increased engagement or vice versa). Moderation should also be explicitly tested by modelling interaction terms (Knowledge Sharing x Motivation; Knowledge Sharing x Engagement) and testing conditional effects with simple slopes (Hair et al., 2022). To lessen the common method issue, the next generation of research can include multi-source measures like peer review, teacher portfolios, or student feedback regarding creative teaching results in line with the present best-practice warnings of method bias in behaviour research (Podsakoff et al., 2024). Lastly, supportive leadership, psychological empowerment, and creative climate can be included within the scope of other explanatory variables that might enhance the knowledge of organizational conditions that transform shared knowledge into sustained teaching innovation (Liu et al., 2024; Zargar et al., 2025).

Author Contributions

Mohsin Baig and Asim Azhar contributed to the conceptualization, research design, methodology, questionnaire development, data collection, data curation, statistical analysis, interpretation of findings, and preparation of the manuscript. Both authors contributed to writing—original draft and writing—review and editing. Both authors read and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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Data Availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request. All relevant data generated or analysed during the study have been included in the article.

Use of Generative AI

The authors declare that no generative artificial intelligence tools were used to collect or analyse the data, generate the scholarly content, interpret the findings, or formulate the conclusions presented in this article.

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